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Trouncing Tire Transgressors

HEARTENING it is to every honorable tire manufacturer and distributer to learn that the United States Federal Trade Commission is making the way of the gyp transgressor harder than ever. As pointed out in *Tires,* this federal body is one of the most efficient of our governmental agencies, functioning like a commercial policeman with a nation-wide beat and keeping the black sheep of tiredom from grazing on fairly preempted preserves. As the tire industry developed, with it grew to rather alarming proportions the parasitical traffic of the gyp tire maker, rebuilder and dealer, and for a time reputable tire men were sorely puzzled as to how best to checkmate them.

Fortunately the federal body came to the rescue, and while the gyp has not been, and perhaps never will be, quite exterminated, certainly his pernicious activities have been decidedly controlled, and this unscrupulous offender taught some respect for the ethics of trade. The government agency has in numerous instances rebuked high-sounding but misleading mileage guarantees, the palming off of poor rebuilts for famous factory seconds, stopped the misbranding of casings, and particularly the deceit of trading under names closely resembling those concerned in the forefront of the industry whose most valued asset is their unsullied reputation. So, too, has the Federal Trade Commission established reasonable regulations to distinguish the honored pioneer from the unworthy trailer, even though the latter's family name which he would use in trade chanced to be identical with that of the pioneer.

Especially gratifying is the prompt relief afforded by appeal to the federal body. For it there is no bottomless chancery, no law's delays. Action speedily follows complaint, the identity of the complainant is disclosed, there is no expense as in pressing a court suit for damages sustained through unlawful competition, and when the accused finds that his only redress lies in the United States Circuit Court he rarely shows fight. Not the least advantage of such protection is that which accrues, too, to the ultimate consumer.

The Pioneer Hevea Planter—American

IN the interest of historical accuracy we must take issue with a statement made by our good friend, the *Rubber Age* of New York, in its issue of May 25th. It runs thus: "John J. Watson, Jr., may be called the father of the rubber plantation movement in the United States. It was he who first suggested to the United States Rubber Co., in 1908, that they investigate the possibilities of cultivating rubber in the Far East."

Passing over the fact that more than 200 rubber plantations were installed in Mexico and Central America as early as 1901 as not counting, because of their non-success, we come to the beginning of American interest in Hevea planting in the Far East.

The first American plantation there was the Pahang Rubber Co., Limited, of which Dr. E. C. Waterhouse was president. This was installed in 1906. A year later, 1907, the same alert American and his associates formed the Tanjong Olok Rubber Plantation Co., Limited, installing this plantation in Johore. Thus Dr. Waterhouse might well be called the father of the American rubber plantation movement.

Or going back to 1905, there comes to mind the annual banquet of the Mechanical Rubber Manufacturers Asso-

ciation at the Waldorf-Astoria in New York, B. G. Work presiding. By his side was Col. Samuel P. Colt. A speaker in addressing the banqueters said: "Last year 67,000,000 pounds of wild Pará rubber from the Amazon were produced. This involved the tapping of 20,000,000 trees. There are today in the Far East more than 20,000,000 Hevea trees that will soon be producing more than 67,000,000 pounds of plantation rubber."

To prove Col. Colt's conversion to rubber planting he later invited the speaker to several conferences, secured all available printed matter, and speaking of tropical lands said: "Sumatra strikes me as being better even than Malaya for a big plantation." This was in 1906 and 1907.

This is not a criticism of the very capable and genial Watson nor does it hold any unkind criticism of our usually accurate contemporary. But to us the pioneer suggester, as far as Hevea planting goes, seems to be either Col. Colt or Dr. Waterhouse.

Appreciating the Workers' Position

FORTUNATE is the factory that has a superintendent who is thoroughly human. Too often the man in direct control of foremen and operatives is so eager to make a good impression on his employers, or is so obsessed with the idea of his importance, that he fails to realize the fact that it would redound to his own and his employers' advantage were he to regard his coworkers as something better than mere "help." Methods more or less coercive may yield a fair return for the pay-roll, but where a just regard is had for the human element a closer approximation may be made to maximum efficiency. In sports the successful contesting team is generally lucky enough to have a captain who is entirely *en rapport* with his men, who is above all things fair, who can cordially encourage as well as tactfully chide, who knows the value of team work, and knows how to get best results with it. Factory team work is more valuable and may be quite as attainable as in sports.

Would a superintendent keep his men contented and combat the insidious activities of "red" agitators? Let him make the employes realize that he is a real friend who has their best interests at heart, that he is absolutely impartial and thoroughly appreciative, and that there is reward or recognition for every employe who takes pride in his work. The cowed worker is usually listless or resentful, and a poor asset to any shop; whereas the man who is made to feel that he is a real coworker with the shop's head toils with a will and registers well in loyalty and efficiency. Sometimes it is nothing more than an agreeable passing comment by the "super" on his rounds that puts a worker in a better frame of mind and excites in him a warmer regard for his employers. Frequent personal touch is important, and a sensible superintendent can easily strike a happy compromise between aloofness and familiarity.

One factory may have the most modern construction, up-to-date equipment, ingenious systems, and highly trained overseers and executives, but if it lacks the hearty cooperation of its working force it will be scarcely more joyful than a jail and certainly more handicapped in competition than another factory the management of which appreciates the position of the workers and ever seeks to win their good-will.

WHAT HAS BEEN PERHAPS THE CHIEF IMPEDIMENT TO the development of the rubber growing industry in the Philippines is about to be removed. According to Dr. James W. Strong, of Mindanao, the land laws restricting individual holdings to 2,500 acres are about to be changed by the Legislature so as to allow the holding of 50,000 acres on excellent terms for forty years. It is pointed out that not only are soil and climate ideal, but that labor is abundant, especially in the northern islands, and there is no need to import Chinese or East Indian help. Crop yields are high. On many thousands of acres now in bearing in Basilan 500 pounds an acre are obtained, as contrasted with ordinary yields of 350 pounds an acre in many parts of the Malay states. Nor does this take note of the possibilities of bud-grafting to increase later yield. Records show some rubber trees in the Philippines yielding as much as 30 pounds a year. With 80 such trees to an acre the yield at that rate would be as high as 2,400 pounds, a remarkable plantation showing, but hardly to be expected at present.

THE FACT THAT MESSRS. FIRESTONE AND FORD HAVE stirred things up in a manner characteristic of both will ultimately prove of value to the world's rubber trade. In ten years from now there should be double the number of planted Heveas that exist today; that is, unless some other rubber producer arrives. That it will take six years to see results may or may not be so. If the Detroit organizer tackles planting, one need not be surprised at movable rubber orchards carried through central factories delivering 30 by 3½ tires before emerging into the open.

THE SPECIFIC FAULT WITH THE STEVENSON PLAN IS that it puts a premium on inefficiency. The thrifty, farseeing, up-to-date rubber planter can of course make a good profit at a price that would show a loss to his less well-equipped neighbor. According to the law of the survival of the fittest, those who cannot compete would be forced out of business, and later increased profits should come to those able to weather the storm. From an altruistic governmental standpoint, however, the lame and lazy should be helped while the worthy planters help themselves.

"BUT IN LOWLINESS OF MIND LET EACH ESTEEM other better than themselves. Look not every man on his own things, but every man also on the things of others." Philippians 2: 3, 4.

American Dependence on British Grown Rubber

Whether or not America should plant Hevea is an open question. Certainly the present situation does not seem to demand it. If, however, we can develop a rubber supply in our own possessions, from tuber, vine or shrub that will involve annual planting and harvesting it should be done. Something akin to the sugar beet as in sugar production, that would produce rubber at five or six cents a pound, would not only be creative but of the greatest value to the world.

The record that follows is in no way a criticism of Brazilian export practice, which is dictated by necessity; neither is it an arraignment of the gatherers of wild rubber in tropical jungles, who labor under frightful handicaps. Nor is it propaganda. It is simply the story of conditions that go to make up a complex situation, which so far seems not to have been understood. Furthermore, it will be evident that British planters are and have been saving the world's rubber manufacturers millions of dollars annually. They have furnished the raw material out of which came many motor and tire millionaires; and in all fairness, this should be remembered.

OUR dependence upon Great Britain for plantation Hevea is viewed with alarm by some who have given to the American press only partial information. It is certain that we must depend upon somebody for this vital crude material, just as others will depend upon us for our manufactures. To whom then shall we turn for quantity product, not tax burdened, wonderfully standardized, and shipped at prices less than those for a century?

Because rubber (which for 42 years averaged 89½ cents a pound) now sells at the "prohibitive price" of 30 cents, it is urged that we abandon British-grown rubber and put in our own orchards. To do this we must use British methods and British knowledge. The result of forty years of work on the part of trained botanists, foresters, mycologists, chemists, and agricultural experts, generously financed by the British Government, is to be calmly appropriated to our own advantage.

We forget that all rubber planting, Castilloa, Ceará and Ficus failed, and that no Hevea rubber planting in the Americas, in Africa, in Asia, has been successful unless done in accordance with the scientifically established British methods.

Finally, we take advantage of that marvelous discovery, "wound response," something as vital to planting as is vulcanization to manufacture, as if it were our own. We fail to remember that it was discovered not by accident but through hundreds of tapping experiments of every conceivable kind, and searching analysis of the results obtained. It is not exaggeration to state that this and this alone made the great Hevea plantations possible. Moreover, it is through the Ceylon Department of Agriculture and the scientists in charge of their experiment stations at Peradeniya and Heneratgoda that this came about. Every Hevea plantation, present or future, British, French, Dutch, or American must use this system, which was given freely to the whole planting world.

It was British mechanical and engineering skill that brought about standard coagulating in bulk by the hundred gallons, instead of by the teaspoonful; and sheeting and drying by machinery economically and on a large scale.

Finally, from a broad humanitarian standpoint should not the array of docile, capable rubber gatherers, Indian and Chinese be given a thought? They number more than three million.[1] Recruited from the overcrowded parts of India and China, born to starvation and disease, the work in British orchards has been a godsend. Fair wages, good treatment, medical attention, all these are theirs. They are also free from "Congo atrocities" and "Putamayo horrors" that stain the history of wild rubber exploitations. Theirs is one of the greatest missionary triumphs of modern times.

Viewing the world's tropical and non-tropical countries and dependencies other than British in the light of the past dealings, can any other, except the Dutch, supply plantation rubber without burdening it with heavy taxes? As to our own tropical possessions, how long would it be before labor unions would demand prohibitive wages for tappers and factory workers?

[1] Based upon Francis Halloway's estimate of 100 coolies for each 100 acres.

Wild Rubber and Its Taxes

Crude rubber has been an article of commerce for 100 years. For 80 years the product was "wild rubber" coming from tropical jungles, in the Americas, Africa and Asia. The grades which in the beginning were but two, "Pará" and "Java," steadily grew until they number 230 to 250. Gathered in the crudest fashion, by natives, brown and black, often in regions never visited by white men, the product arrived in a great variety of physical shapes. Negro heads, balls, sausages, thimbles and slabs are indicative of their general contour.

The native gatherers, however, early discovered that the addition of sand, earth, bark, stones, or blocks of wood, gave additional poundage. Moreover, the addition of other and inferior latices served the same end. So did the sunning of big balls seal the water in the inner layers. With truly savage indifference they girdled or cut down the trees, coagulated the milk in holes in the ground, or on their own odorous bodies, and produced a gum that for foul smell was unapproachable in any other commodity.

When wild rubber reached the manufacturer it was necessary to tear it to pieces in washers and get rid of all foreign substances. After drying, the shrinkage varied from 18 to 50 per cent, which, of course, was added to the original cost. According to official records, the crude rubber exported from the Valley of the Amazon from 1836 to 1923, inclusive, totaled 2,771,382,387 pounds. Reckoning the average price at 70 cents per pound (it was more), the South American collectors of wild rubber collected from consumers during that period the prodigious sum of $1,939,967,670. Had 100 per cent rubber been supplied, even the average price named could hardly be criticized, but the rubber sold was not all rubber. It was subject to shrinkage. Suppose this be set at 20 per cent on all grades. Inasmuch as only 80 per cent was available raw material, the consumers suffered a clear loss in dollars and cents of $387,993,534.

Nor does this take into account the heavy export tax of 23 per cent paid by rubber consumers for the same period, which was $446,192,564.30. When the amount lost in shrinkage is added to that paid in export tax, we get the astounding total of $834,185,098. It is only fair to figure also the approximate loss to rubber manufacturers from an even greater shrinkage in Central American, African and Asiatic rubbers. This may be put at the very conservative figure of 923,460,796 pounds, or one-third of the total Amazonian crop. This figured at 50 cents a pound with a 30 per cent shrinkage gives $13,851,911, which added to the former figures totals $847,937,010, not far from a billion.

Another wild rubber disability is its extreme variability. This is due not only to methods of gathering, but to its constituent parts, and is chiefly apparent in the resin content. Pará rubber, the highest grade, has roughly 2 per cent of resin, while Pontianak rubber contains 90 per cent. Between the two are scores of varieties with differing amounts. In use, particularly where one grade is substituted for another, which is often necessary, the result is badly damaged goods. Hundreds of thousands of dollars have

been lost to manufacturers from this cause. Plantation Hevea, practically standard, of course, is free from the fault.

American Rubber Planting

Rubber planting was first undertaken, not in the Far East, but in the New World, specifically in the island of Cuba. In 1830 seeds of the *Castilloa elastica* were brought from Guatemala to Cuba and distributed to various planters in Havana province. Of the plantings only a few giant trees on the plantation El Aljibes remain, and they have never been tapped. Interest lapsed after that until 1898, when came the report of Sir Henry Neville Dering, British Minister to Mexico, to the Foreign Office stating that a 100,000 rubber tree plantation five years old, costing $25,000 (silver) would show a profit for 20 to 30 years of $100,000 per annum.

Next followed the publication by the Mexican Minister to the United States, Señor Matias Romero, of a 400-page book, "Coffee and India Rubber Culture in Mexico." In 1899 came the message of President William McKinley to the 56th Congress in which he advised rubber planting in Hawaii, Porto Rico, and the Philippines.

Within a year a start was made, and a flying start. The tree selected was the *Castilloa elastica*, indigenous to Central America. Land was acquired and big plantings started in Mexico, Guatemala, Costa Rico, Honduras, Nicaragua, and Colombia. It was chiefly in Mexico, however, that the work was done. Hundreds of stock companies were formed and all sorts of glowing pamphlets issued. One hundred and forty-five companies whose literature is available showed an authorized capital of $74,539,400 and owned 1,665,646 acres of land. Eighty-eight of these companies planted 31,933,183 rubber trees, and thirty-three reported 7,873,000 rubber trees in nurseries.

The United States Department of Agriculture, handicapped although it was for funds, sent experts to the plantations and issued excellent reports, which advised caution. They were of course unheeded. Then came the awakening, failure, bankruptcy, and the loss of perhaps $50,000,000. This failure came not altogether because of fraudulent schemes, nor because the wrong tree had been selected, but largely because of a lack of knowledge. Tropical planting is a science, which no American had mastered.

British Rubber Planting

For more than fifty years the British tropical gardens and experiment stations had been sending to all parts of the world for rubber-bearing trees, shrubs and vines. One has only to recall the Castilloa brought by Robert Cross from Central America to Ceylon. Also the 100 Hevea plants the same sturdy pioneer brought from Pará, followed a year later by Wickham who brought out Hevea seeds. Ceara, Landolphia, Ficus, and scores of lesser producers were also secured, tried out in the most painstaking manner, and the results published for the information of all. Finally Hevea was found to be by far the best suited for large scale planting and the others were abandoned.

Men like Trimen, Thwaites, Willis, Ridley, Wright, and scores of others in the Imperial Department of Agriculture spent years in the study of rubber planting. They solved all the difficult problems of culture, of tapping, of coagulating. They took a haphazard industry and recreated it, made it orderly, coherent, successful.

The Pará rubber tree, so valuable as a constant milker, is nevertheless a tender plant subject to hundreds of enemies, animal and insect, and to root, stem, bark and leaf diseases. All of them were studied and successfully combated by British Government scientists. Indeed, had it not been for their work no Far Eastern plantations would be in existence today. All of their work has been published and is free to the whole world.

Hevea seeds and stumps, once its cultivation seemed feasible, were sent to tropical countries in the Americas, Africa, Asia and Oceanica by the Far Eastern botanic gardens, with full instructions as to care, the best means for propagation, etc. Nor was this to British territory alone; German, Belgian, French and American possessions were equally favored.

The Far Eastern Cost Situation

The most anxious period through which the rubber growing industry has ever passed extended over two years, or from about October 1, 1920, to October 31, 1922. During that time the price of first latex crêpe dropped in the American market, where about 80 per cent of it is sold, from 26 to 13¾ cents. In anticipation of the enactment November 1, 1922, of the Stevenson restriction plan, based on a minimum of 29 cents, the price rallied in October, 1922, from 15¼ to 22¾ cents per pound; in January, 1923, it went to 37½ cents and dropped in May to 27½ cents. Evidence is abundant that the price range in that period showed not only no profit but a decided loss for most planting companies.

Confirming the investigations of others, B. G. Work, president of The B. F. Goodrich Co., states that the average cost of plantation rubber is not less than 9*d* (17½ U. S. cents) per pound. To this, he states, must be added the underlying capital cost, bringing a necessary selling price of 31 cents per pound in order to return 15 per cent on the investment. P. W. Litchfield, vice president of the Goodyear Tire & Rubber Co., contends that plantation rubber costs from 25 to 30 cents per pound to produce, and that the price would have to be from 30 to 35 cents per pound to justify investment of capital which must wait years for returns.

The profit in raising rubber, as in cultivating any other grown commodity, lies in the spread between the complete cost and the selling price. For a long period prior to the adoption of the restriction measure this spread had been steadily contracting, until finally it disappeared owing to the fact that the market price went so low as to even encroach on the actual cost of production. This "all-in" cost was reported by twenty leading plantation companies in 1916 as averaging 13.91*d* (27 U. S. cents). For 1921 ten of the largest companies reported an average all-in cost of 11.833*d* (23 U. S. cents). The reduction was due to strict economy and the adoption of the most efficient methods.

In a speech reported in the London *Financial Times*, December 15, 1921, Chairman F. R. McNair Scott, of the United Temiang (F. M. S.) Rubber Co., Limited, held that, to provide for 15 per cent dividend on invested capital and to allow for depreciation and ordinary estate administration and other costs an economic, normal selling price for rubber would be 2 shillings (46 U. S. cents) per pound.

It has been pointed out that in 1921 many planting companies sold rubber at a loss of from one to six pence a pound; and that were the low prices to continue much longer a marked drop in production would be certain, as many rubber raisers would be compelled to quit through inability to tide over the slump. Yet, taking the highest and the lowest prices for first latex crêpe for each of the 25 months in the low period, it appears that the average price received by the planting interests was but 17-1/10 cents per pound, or less than the mere operation cost of 17½ cents referred to.

During the low-priced period the plantations supplied 76,000 tons for the last three months of 1920; 264,300 for the twelve months of 1921; and 384,250 for the first nine months of 1922; total, 624,550. Stray shipments during the period would easily bring the total to 650,000 tons of 2,000 pounds, or 1,300,000,000 pounds. Taking the average price received by planters during the low period as 17-1/10 cents, they received for their product $222,300,000. If, however, the all-in cost to them averaged 27 cents a pound they should have marketed the 1,300,000,000 pounds at a total of $351,000,000 to break even. But they evidently lost the difference, $128,700,000, and that sum became virtually a tax on the planters. It might be fairly termed their gift to the rubber manufacturers of the world.

Reports rendered by sixty-six rubber plantation companies or-

ganized on the dollar basis show that in 1921 fifty-nine paid no dividends and seven paid small interest dividends. Of forty Dollar companies reporting for 1922, thirty paid no dividends and but ten paid moderate interest dividends for the year, as compared with nothing for 1921.

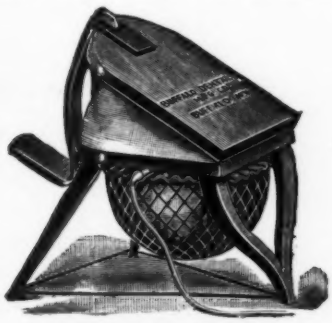
When British Might Have Taxed

During the World War, when extra revenue was urgently needed by Great Britain, that nation might have taxed American manufacturers justly even 20 per cent on the rubber supplied by it directly or from its colonies. In the four years of the war the United States bought approximately 320,000 tons of rubber from British sources, or 640,000,000 pounds. At an average price of 60 cents a pound this involved $384,000,000. Had a war tax of 20 per cent been imposed, American manufactures would have had to pay $76,800,000 additional for their rubber. Instead of taking any advantage, Great Britain not only relaxed its embargo on rubber for the benefit of the United States but let buyers here get their rubber on practically the same favorable terms as accorded to British buyers.

Inflation of Toy Balloons

The inflation of toy balloons with hydrogen gas or air is done very quickly, safely, and easily by means of the equipment shown in the illustrations. The gas filling device is attachable to the top of a cylinder of compressed gas and comprises a cock, pressure gage, and outlet for receiving the neck of the balloon. The influx of gas is easily controlled by the operator. Hydrogen gas is about 14 times lighter than air and balloons inflated with it are unusually buoyant and attractive.

Gas Inflating Device



Foot Bellows for Air Inflating

For air inflated balloons a hand or foot power bellows is employed. These are built with leather gusset and rubber air pressure regulator above or below supported by a strong network of cord to receive surplus pressure.—The Oak Rubber Co., Ravenna, Ohio.

IN 1921 THE UNITED STATES IMPORTED 415,283,000 POUNDS OF crude rubber, and in 1922, 674,410,000 pounds, while the pre-war average was represented as 100,179,000 pounds. This is a gain in 1922 over figures for the year previous of 62.4 per cent, and an advance over pre-war figures of 573.2 per cent. According to value, crude rubber ranked in 1922 as fifth in a list of 100 of our chief imports, the figure being $101,843,000. This importation represented, in value, an increase of 38 per cent over that of the year preceding. It should also be remembered that while our total exports of all commodities in 1922 were 15 per cent below the 1921 total, our imports made a gain of 24 per cent.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

(212) A correspondent asks for addresses of hard rubber manufacturers, who will make parts from molds furnished them.

(213) Information is asked concerning Tripoli flour—where it comes from and where it can be purchased to best advantage.

(214) A reader who is in the market for approximately 100,000 inner tubes, wishes advice as to where such may be purchased.

(215) We are asked for addresses of firms in New York City supplying Mexican chicle of good quality; also firms who can furnish gutta siak, pressed Pontianak, and white gutta rolls.

(216) Request is made for addresses of manufacturers of molded rubber articles such as fountain pen bodies, ear trumpets, etc.

(217) A prospective manufacturer of toy balloons desires to know where he can purchase the requisite machinery.

(218) A correspondent is interested in ascertaining the addresses of manufacturers of machines which automatically cut out and inlay rubber matting; of manufacturers of equipment for making and dipping balloons; and of manufacturers of equipment used in making bathing caps, especially with regard to the frills.

(219) We are asked for addresses of manufacturers of rubber belts.

(220) Addresses are requested of concerns making or handling machines for cutting crude rubber into pieces.

(221) A reader asks for information concerning manufacturers of gutta percha tissue.

(222) We are asked to advise where mercury can be purchased.

Foreign Trade Opportunities

Address and information concerning the inquiries listed below will be supplied to our readers through the Foreign Trade Bureau of The India Rubber World, 25 West 45th street, New York, N. Y. Requests for each address should be on a separate sheet and state number.

Number	Country	Commodity	Purchase or agency
6,545	Peru	Bicycle tires	Exclusive agency
6,555	Italy	Auto tires	Purchase
6,556	Italy	Rubber overshoes, goloshes, arctics, and other rubber goods	Purchase and agency
6,557	Yugoslavia	Solid rubber tires for trucks	Agency
6,575	Austria	5,000 pairs of rubbers	Purchase and agency
6,665	Czechoslovakia	Belting and hose	Purchase
6,804	Poland	Automobile tires	Agency
6,807	Poland	Tires	Agency
6,819	Poland	Tires	Agency
6,822	Poland	Tires	Agency
6,831	Brazil	Druggists' sundries	Purchase and agency
6,833	Poland	Tires	Agency
6,837	Poland	Technical rubber goods	Agency

Foreign Tariffs

The Rubber Division, Bureau of Foreign and Domestic Commerce, Washington, D. C., has recently issued the following special circulars regarding foreign customs tariffs:

Circular No.	Country	Articles
200	India	Rubber Goods
201	Denmark	Rubber Goods
205	Dominican Republic	Rubber Goods
208	Haiti	Rubber Goods

Further particulars can be obtained from the Foreign Trade Bureau of THE INDIA RUBBER WORLD, 25 W. 45th street, New York, N. Y.

Shoeing a Car With Low Pressure Air—I

By J. E. Hale[1]

THERE are good reasons for believing that the automobile industry is on the threshold of the third great development in pneumatic tire construction.

The motor car industry grew and expanded through its development years on square woven fabric tires of rather small cross-section. The art of building tires was new and our best constructions in those days were the small, stiff carcasses which naturally called for high air pressures. Their shortcomings

Fig. 1. Reo Car Equipped with Air Cushion Tires

are too well remembered to need recalling, to say nothing of the range of sizes and the struggle for ascendency between clinchers and straight sides.

The employment of cord fabric in carcass construction was the second step in advance in pneumatic structure. By virtue of this change in carcass construction, together with the realization of the importance of more ample sections, tire mileages were greatly increased, with a corresponding reduction in cost. There was not only a mileage increase, but the tires were much more reliable and not subject to such exasperating failures.

It is possible that with the consummation of the improvements and changes under the development at the present time, the third step is ready to be entered upon. In this move we will take advantage of the cord construction which has proved its durability and reliability, combine this with a much larger section and thinner wall and make it possible to ride on low pressure air for the protection of the car and greater comfort of the passengers, and this without sacrificing in economy.

Someone has facetiously said that Goldberg, the cartoonist, in portraying doughnuts for wheels in his pictures was the originator of the idea. He depicted large section tires truly enough, but the large section is not necessarily the whole story. On the other hand, many an automobile owner of his own volition has allowed his tires to be run under-inflated for his own personal comfort, explaining in a casual way that he did not intend to be shaken to pieces by the air pressures which the tire companies recommended, and that he was willing to sacrifice tire economy if necessary to secure this greater comfort; that is, he wanted to ride on low pressure air. Also a few cases are known where 6-inch or 7-inch thick walled pneumatic truck tires and truck rims have been applied to passenger cars and run at low pressure, notably by tire experimenters; presumably more in the nature of a stunt, since it does not appear that they had any serious thought of pushing the idea for actual commercial application to passenger cars.

This newest development, the air cushion tire, is the result of a deliberate attempt to make riding on low pressure air possible. It is the natural consequence of a strong conviction on my part that there ought to be a way to accomplish it that led the Firestone company to take the bold step in going to an extreme and providing carcass flexibility, and a section size sufficient to give a larger area of contact. Fig. 1 shows my Reo car as it appeared when equipped last October with the original set of these tires which were constructed with 4 plies of cord fabric, molded to 7¼-inch section, had a 20-inch wheel diameter and were inflated to 18 pounds.

The fundamentals of this movement are comparatively simple. If we are to have greater cushioning for comfort and protection against vibrations of the car, the combination of low air pressure and large area of contact must be provided and by employing such tire constructions that the tire durability may not be impaired. The goal aimed at was to increase the area of contact sufficiently so that air pressures ranging from 20 to 35 pounds could be employed in actual practice.

In a general way the contact area of the tread with the road expressed in square inches multiplied by the internal air pressure will give a figure which approximates the load resting on the tire. This is as it should be. It is evident that if a 1,000 pound load is to be imposed on the tire, and due to the limitation in the amount of vertical deflection not more than 20 square inches of contact can be obtained, it will require 50 pounds of air to carry the load. If, however, we can devise some way of increasing the area and still not exceed the proper degree of deflection, for instance if we can increase the area to 50 square inches, it will require very much less pressure, and in this case only 20 pounds to carry the same load. Fig. 2 shows the tread imprint of a 7.30 air cushion tire compared with the 33 by 5 high pressure pneumatic, each tire having been loaded to 1,700 pounds, but with 35 pounds of air in the air cushion tire and

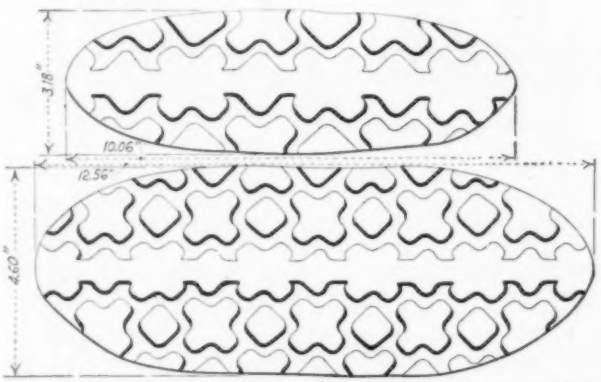


Fig. 2. Tread Imprints of Standard 35 by 5 and 7.30 Air Cushion Compared

65 pounds in the 33 by 5. The vertical deflection of these two tires is shown in Figs. 3 and 4 to enable one to visualize the cross-sectional difference.

One of the fundamental conditions of conservative tire use which we recognize is the limitation of the actual vertical de-

[1]M. S. A. E., Manager of Development Department, Firestone Tire & Rubber Co., Akron, Ohio. Paper read at the June meeting of the Society of Automotive Engineers, Spring Lake, New Jersey.

flection of the tire expressed in a percentage relation of the sectional diameter. It has been found that if this percentage of deflection is exceeded, the tires are likely to fail prematurely from two causes: First, tread separation and ply separation are likely to be excessive; second, the flexing localizes half way up the sidewall and may cause fabric failure on the inside plies. It can be readily appreciated that in the case of a thick-walled tire, the destructive effect of this flexing will be much more pronounced than in the case of a thin-walled tire. But if we use low pressure air, the bursting stresses on the carcass are low enough so that only a few plies are necessary, and this in turn makes it possible to increase the deflection percentage. Table A lists the percentage deflection limitations of high pressure pneumatics; also other fundamentals for comparisons to be referred to later.

Our tentative air cushion tire schedule offers 4 section sizes for passenger car use, each size to be made of no more than 6 plies, so constructed as to permit their normal use with pressures between 20 and 35 pounds, and to be used on rims whose width is approximately 45 per cent of the tire section. Table B shows figures comparative to those of the high pressure pneumatic.

What the Air Cushion Tires Do for the Car

I find it almost impossible to choose descriptive phraseology to drive home the wonderful effect that these tires have on the riding of the car. The first reaction to the occupants is the greater degree of comfort. Road surface irregularities are

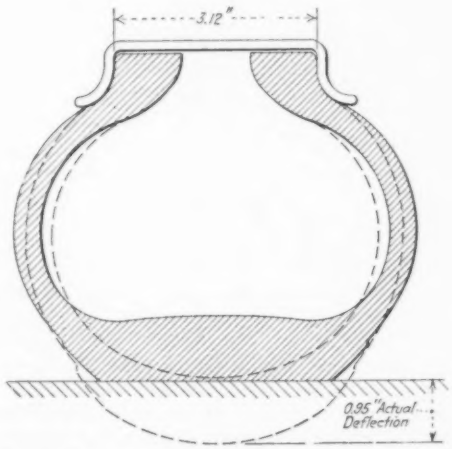


Fig. 3. Deflection of Standard 35 by 5 Tire Under 1,700 Pounds Load and 80 Pounds Air

toned down and in most cases are obliterated. Of course, the ups and downs in the road are still there and the car goes up and down with them, but everything is cushioned so that

TABLE A

HIGH PRESSURE PNEUMATIC CORD TIRES FOR PASSENGER CARS AND MOTOR TRUCKS

Size				Max. Permissible Deflection		Road Contact	
Nominal	Actual	No. Plies	Max. Load	Actual	Per Cent	Area	Length
Passenger Car Tires							
3½	3.51	4	650	.68	19.4	10.9	7.20
3½	3.70	4	700	.83	22.4	11.8	7.85
4	4.40	6	1,000	.81	18.4	17.0	8.90
4½	4.95	6	1,250	.90	18.1	21.4	9.45
5	5.80	8	1,700	.95	16.3	26.3	10.00
Pneumatic Truck Tires							
6	6.60	8	2,200	.86	13	36.7	9.00
7	7.70	10	3,000	.92	12	45.8	9.60
8	8.80	12	4,000	.97	11	54.4	10.08
9	9.90	14	5,000	.99	10	67.0	11.20
10	11.00	16	6.000	1.10	10	79.5	10.35

TABLE B

AIR CUSHION TIRES FOR PASSENGER CARS

Size		No. Plies	Maximum Load	Max. Permissible Deflection		Road Contact	
Nominal	Actual			Actual	Per Cent	Area	Length
4.40	4.40	2 or 4	750	1.01	23	20.2	8.90
5.25	5.25	4	1,000	1.21	23	28.5	9.93
6.20	6.20	4 or 6	1,300	1.42	23	36.7	10.70
7.30	7.30	4 or 6	1,700	1.68	23	48.3	12.50

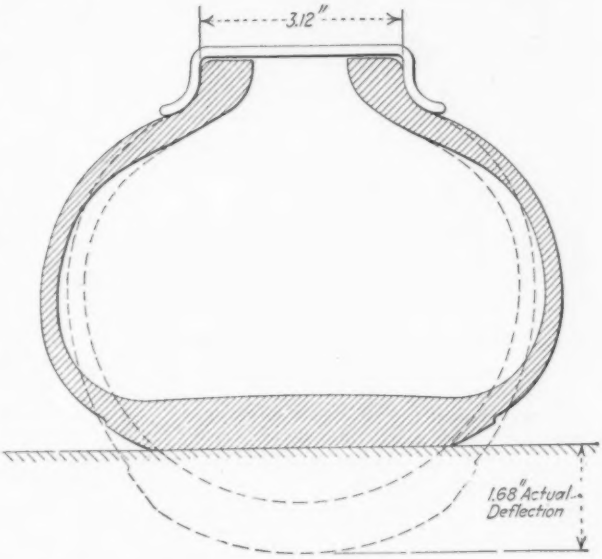


Fig. 4. Deflection of 7.30 Air Cushion Tire Under 1,700 Pounds Load and 35 Pounds Air

there are no sharp shocks or jolts, and one does not have to watch the road to put his body in a tense condition to get over the rough places, nor be worried about being tossed up from the seat, and furthermore the driver does not have to pick out all

Fig. 5. Seven-thirty Air Cushion Tire Inflated with 18 Pounds Air Absorbing Heaved Up Brick

the good places in a rough road, because it makes little or no difference whether he takes them in or not.

It is truly marvelous how a car equipped with 7.30-inch tires will negotiate a frozen road, and as an extreme, I have seen a

Packard car driven over the ties on a railroad track with little discomfort to the occupants; and of extreme convenience is

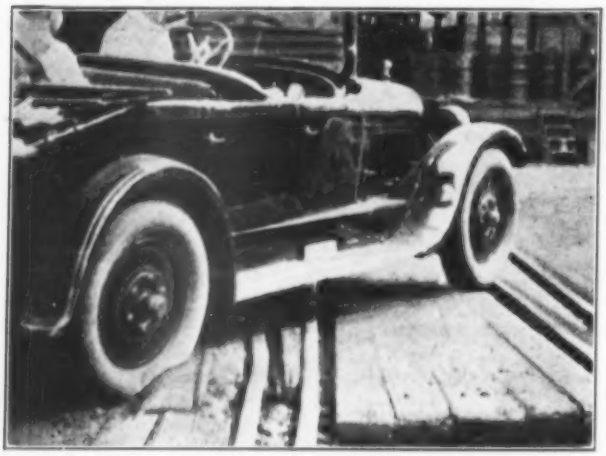


Fig. 6. Study of Moving Car Equipped with Air Cushion Tires

the fact that in suburban driving where it is necessary to go off the pavement, one does not have to take any special precaution to slacken the speed, because the average rough road can usually be taken at the same speed as the pavement. Another important factor is that on rough roads, particularly in the country, the air cushion tires smooth out the road so that a substantially higher average speed is practical.

Of equal importance to improving the degree of comfort is the effect on the mechanism and body of the car itself. So far no way has presented itself of making deliberate comparisons of the effect of low pressure air in preserving the car from developing rattles, creaks and mechanical depreciation, but there is no question about its being a tremendous factor, and all because of the fact that everything is cushioned. Compared with high pressure pneumatics, the sharpness of the shocks is very effectively softened. By way of example, one of our new test cars has been running on 6.20-inch air cushion tires with about 20 to 25 pounds of air; for the purpose of comparison, 4-inch

Fig. 7. Study of Moving Car Showing How Air Cushion Tires React Against Curb

regular pneumatic tires with the proper inflation of 50 pounds of air were substituted. As a result of this move rattles appeared which the test car driver had never observed before; in fact, with air cushion equipment he said there were no rattles, which made a noticeable contrast considering the same car on regular high pressure pneumatics.

Since there are no satisfactory instruments for measuring cushioning qualities of air cushion tires, I have resorted to a series of pictures which were taken to make it possible to visualize how the air cushion tires function. Manifestly a thin-wall tire having a very low air pressure and large cross-section with a big area of contact will roll over and envelop any projections with much less tendency to elevate the axle than will a tire with a thick carcass with half the area of contact and high air pressure. The figures show very vividly to what an extraordinary degree the bricks, rails, etc., are absorbed into the tires.

Then there is the case of ridges and holes in the road which have to be negotiated. Here, of course, the tire, wheel and axle must be bodily lowered or elevated, as the case may be, and particularly in the case of a sharp drop as into a chuck hole; these cases are among the most aggravating we have to encounter. In the case of dropping into a chuck hole, the air cushion tires, having a much greater permissible actual deflection in falling through the distance, are more gradually brought to rest, in fact so gradually, that the effect is more of a rolling action.

Believing that the use of ultra rapid motion picture photography might throw some light on the functioning of air cushion tires compared with high pressure pneumatics, we shot some film with the cars operating over a typical road surface. These pictures show some interesting things, and particularly do they enable one to visualize in a strictly comparative way the superior cushioning of the air cushion tires.

RUBBER PAVING WINS AGAIN IN ENGLAND

Perhaps the most striking victory so far gained by the believers in rubber roadways is the proposal, recently accepted by the Westminster City Council, to lay rubber blocks as paving around the Cenotaph, England's famous war memorial. The space to be paved represents a portion of the carriageway in Whitehall, and will measure approximately 1,500 square yards. The expense of the work, some £6,000, is to be borne, free of cost, by Rubber Roadways, Limited.

Another area in Whitehall, the lower end abutting on Parliament Square, will utilize rubber in its paving system, although not in so extensive a fashion. Wood blocks of customary size are to be laid with rubber surrounding them on all four vertical sides, such material being substituted for tar. It is believed that the proposed method will eliminate road-raising, caused by moisture finding its way between and under the blocks.

Still another experiment is being tried in Manchester, England, where large rubber slabs two inches thick and weighing 600 pounds are being used instead of small, individual blocks. The large slabs, intended to reduce "creeping," are at intervals reinforced for rigidity by steel bars, and are also corrugated to give a safe foothold for horses.

A NEW HARD RUBBER CIGARETTE HOLDER HAS A STUB EJECTOR AT one side, resembling the clip on a fountain pen cap. This holder is the invention of Harry H. Harnsberger, New York, N. Y., and is being displayed by F. W. Schoonmaker, Inc., 70 East 42d street, New York, N. Y., under the trade mark "Hadon."

ONE OF THE NEW BATHTUB TOYS IS A SET OF "KIDDIE QUOITS," manufactured by I. B. Kleinert Rubber Co., 725 Broadway, New York, N. Y., which consists of quaint, colored rubber cones with flat bases, resembling dolls' hats, and a number of rubber rings of comparatively small diameter.

Flat Band Built Cord Tires[1]

Unique Method that Utilizes Maximum Strength of Cords and Affords Full Control of Each Stage in Balanced Tire Construction

THE pneumatic tire made possible the development of the automobile and advanced tire manufacture to the leading division of the rubber industry. This condition has given rise to many important inventions in rubber machines, processes and tire design, the net results of which are evident in better tire service at lower costs.

Notable among these advanced methods of manufacture is the recently perfected system by which better tires of scientific design can be produced with great economy in building time, reduction of waste and complete elimination of air bags, core equipment and elaborate building machines.

FIG. 1. FLAT BAND TIRE BUILDING ROOM

Flat Drum Tire Building

The principle underlying the new system of tire building comprises the formation of the tire carcass as a flat endless band with the wire beads enclosed in either edge of the band and properly positioned between the fabric plies. The tire in the flat is then given its approximate profile by inflation on a special machine. Following this operation it is reinflated for a short period under heavy air pressure and brought to mold size before transfer to the vulcanizing mold.

The Modern Tire Factory

The modern tire factory is virtually a huge mechanism consisting of an elaborate assemblage of special machinery and automatic conveyors correlated for the preparation and movement of stocks, equipment and output through the successive stages from raw stocks to product.

In the layout of a factory producing tires by the flat band built method the familiar tire cores, builders' stands and building machines are entirely eliminated as are also air bags. In their places are substituted new types of machinery, important among which are the collapsible building drum, the inflating machine, and pressing or pre-forming mold.

Collapsible Tire Building Drum

The collapsible tire building drum comprises four sections adjustable as to diameter by movement of a hand lever engaging a curved ratchet about an axle mounted for hand or power operation by clutch under foot control. Back of each drum is located a pedestal carrying a rack for supporting rolls of building fabric in liners.

In operation, three settings of the drum diameter are required and are made by the hand lever and ratchet. The drum size adjustments are: (1) the building position used for receiving all plies of the tire that go under the beads; (2) the contracted position used when the beads are placed over the plies, and when the finished band is removed; (3) the expanded position, which is used to tighten the under plies against the beads before addition of outer fabric, plies, breaker and tread.

Inflating Machine

The construction of the inflating machine comprises a group of holding-down bars hinged to the base of the machine, their top ends hooking over a counter balanced cylinder serving as a guide in mounting the flat tire band on the inflating ring. Central in the machine is a vertical hydraulic cylinder and ram which forces upward a conical skirt just under the flat tire which is in position ready for inflation. An air pressure line of 30 pounds is connected to the machine for distending the tire band. Air and water pressure control are centered at a stand of valves.

Cold Mold Press

The inflated tire bands require further inflation and shaping before curing. This is done in cold molds standing parallel on edge in a row supported between bars. Each mold is hinged at the bottom, and the two sides are brought together on the inflated tire mounted on a rim. Pressing the tire is effected by pinching the half molds together at the top edge, clamping them at opposite edge of the horizontal diameter and inserting and tightening up four bolts by hand. A half hour in these molds under 200 pounds inflation sets the tires ready for transfer to the curing molds.

Beads for Flat Band Tires

Wire beads for flat band tires require to be made differently from the usual bead or the endless cable bead. Each bead, in fact, consists of two windings of wire six turns each. The ends of these turns are twisted and soldered and the ends are covered with soldered metal sleeves to prevent them from chafing. The group of two windings in each bead is necessary to permit the wire to turn or adjust itself when the beads are pushed inward as the flat band is inflated to the ordinary tire cross-section.

Special machines are employed for the several processes of making the beads ready for tire building.

[1]The data and illustrations used in this article were supplied by the United States Rubber Co., New York, N. Y.

Building Material

Bias cut cord fabric is supplied to the tire builder, rolled in cloth liners on shells ready for the stock rack. The fabric plies emerge from these rolls in the correct sequence for building. The beads come to the builder semi-cured and cemented. Tread and side-wall stock are run in one piece on the calender. Breaker and treads are booked and stand in racks adjacent to the builders, as may be noted in Fig. 1, showing a flat band tire building room.

Building a Tire Band

Laying the first ply of fabric in building a tire is represented in Fig. 2 where the operator is shown starting the first ply control on the face of the drum which he has adjusted in diameter to the building position.

The application of the beads is shown in Fig. 3, the drum being reduced in diameter to its contracted position. By means of a hook, the operator spins each bead to its place over the guide lines which he has located on the underlying ply by means of the guide hinged and standing folded back beyond the top edge of the drum.

After locating the beads the drum is adjusted to the expanded position which solidly embeds them in the underlying plies. Next follows the operation of enclosing the beads by turning the two fabric plies over to cover them (Fig. 4), rolling and stitching the plies securely in their new position.

Successive fabric plies are then applied, the cords in each ply accurately crossing until the breaker strip level is reached. Fig. 5 shows the operator laying the combination of breaker strips and cushion ply. Following this the chafing strips are applied at the edges of the band.

Before laying the tread and side-wall strip, the hinged guide is folded over, making tire center line on the band. The tread has a center line marked upon it. Guided by these lines the tread is applied as shown in Fig. 6. The side walls extend to cover slightly the edges of the chafing strip. Application to the band of the white stripes or trade mark (Fig. 7) indicates the brand of the tire, which is then complete and readily slipped off the drum 15 minutes after it was begun.

Building Inspection

A tire building inspector is assigned to every six builders, making six inspections of each tire during its building. The inspections are as follows: (1) After first ply is laid, checking drum adjustment, width and centering of ply and lap of splice; (2) after beads are placed, checking spacing of beads, and noting that bias cords of under plies cross; (3) after first turn over of plies covering beads, checking step-off of plies and tightness of plies around beads; (4) after second turn over of plies, checking as under the third inspection; (5) after the last turn over, application of breaker and chafing strips, checking placement of the various parts, joints, and eliminating air blisters; (6) after tread and white stripes are applied, checking joint in tread, freedom from air blisters, and appearance.

Inflation of Band to Tire Form

From the maker the tire bands pass by conveyor to the inflating machines for expanding and inflating. These operations leave the tire in rounded form mounted on a ring and inflated with 30 pounds of air. The operations are as follows:

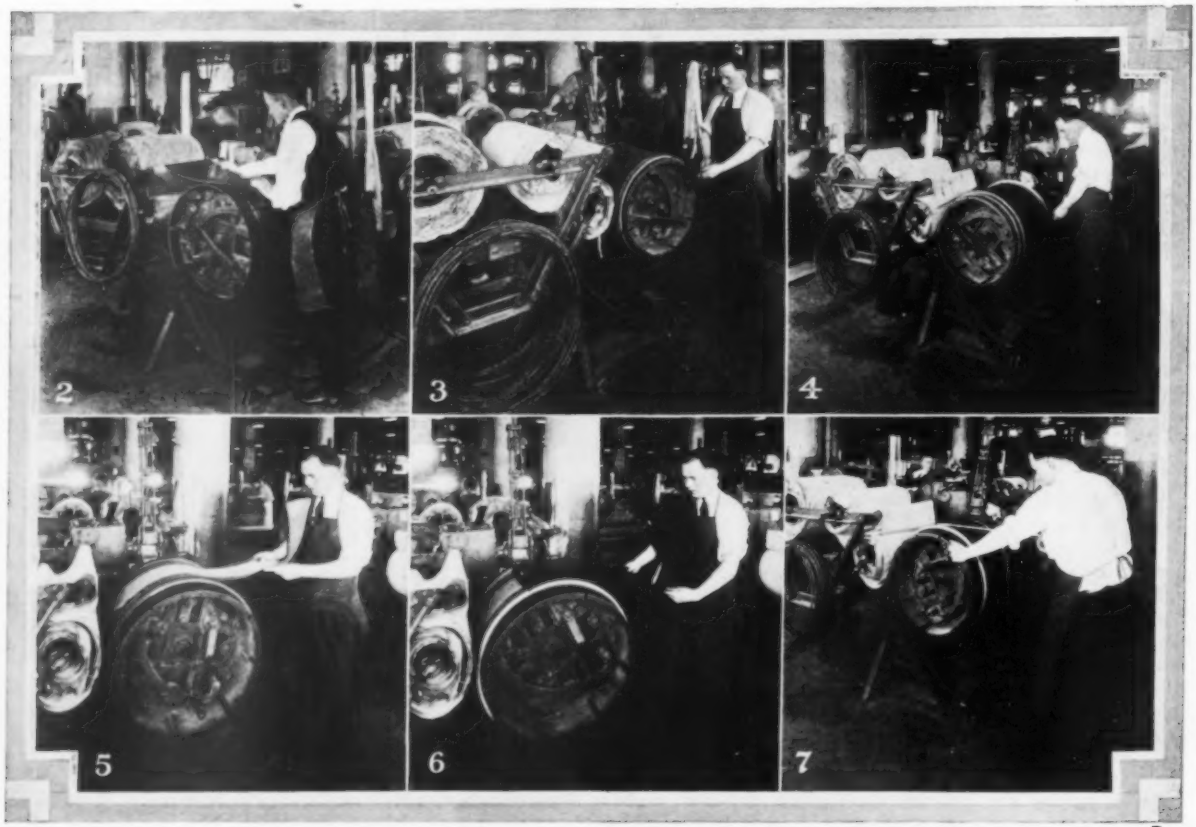


FIG. 2. STARTING BAND PLY. FIG. 3. APPLYING BEAD WIRES. FIG. 4. TURNING FABRIC PLIES AROUND BEAD WIRES. FIG. 5. APPLYING BREAKER AND CUSHION. FIG. 6. APPLYING TREAD AND SIDE WALLS. FIG. 7. APPLYING WHITE STRIPES (TRADEMARK)

The ring at the top of the machine (Fig. 8) is raised and suspended free and a split spring ring is placed around it. A ring of the same sort is placed below for the opposite side of the tire. Next to these, snap or spring rings and carrier rings are placed.

Between the pair of carrier rings the inflating rim bearing a deflated inner tube is located. The tire band to be expanded is mounted on the last named rim, held in place by the carrier rims, not all tensioned either equally or axially. Inflation in the curing mold does not correct this mal-adjustment but makes it permanent, seriously impairing the durability of the tire in service.

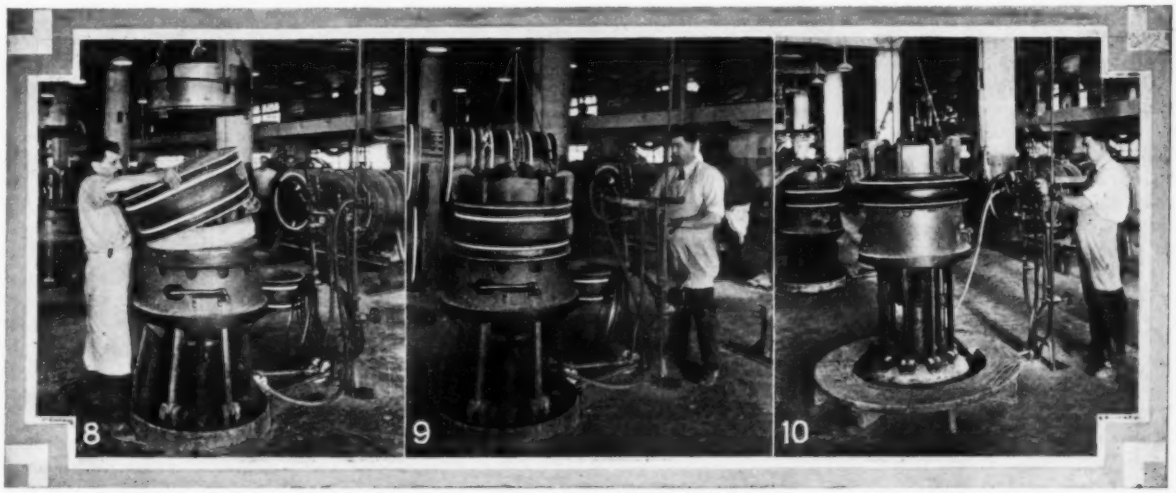


FIG. 8. PLACING TIRE BAND IN INFLATING MACHINE. FIG. 9. READY TO INFLATE. FIG. 10. TIRE BAND INFLATED.

locked in turn by the spring rings which snap into grooves near the edges of the inflating rim.

Thus assembled, the top suspended ring is lowered, the hinged bars are hooked over its top edge securing it firmly, and air at 30 pounds is admitted to the inflating tube. As the band expands the accommodation of the wire beads rotating to position under the inflation is assisted by application of hand prying tools. The mounting of the tire on the rim is effected by the upward push exerted by the conical skirt rising by hydraulic pressure, forcing the beads together. The advance of the carrier ring is followed by the spring rings which finally snap into grooves in the inflating rim locking the carrier rings in place, thus completing the mounting of the shaped tire. See Figs. 9 and 10.

Mold Pressing the Inflated Bands

The mounted inflated band is transferred to the press room, where it is demounted from its rim and the rubber inflating tube removed. It is next mounted on a sealing ring, upon which it remains until cured. The process of pressing consists in enclosing the mounted casings in clamped and bolted smooth-tread molds, inflating with 200 pounds of air and holding this pressing for a half hour. This treatment insures the final adjustment of the individual cords, bringing each one axially with the strain it is to bear. On release from the pressing molds the tires are fully formed, entirely plain, and sized to fit the curing molds.

Curing

The air pressure having been released from the pressed tires, they are adjusted in the curing molds and reinflated with 200 pounds for the cure. Minor adjustments of the internal structure take place during vulcanization. In the curing molds vulcanization, formation of the anti-skid tread design, lettering and sizing, take place.

Advantages of Band Built Tires

In flat-band built cord tires the cord plies are laid without strain or distortion. The crossing of each cord of one ply with the one below acts as a pivot point affording each pair of crossed cords a center of adjustment upon which they swing, so that the strain on each cord comes upon it axially; thus the full strength of each cord is utilized.

In core built cord tires the position of the cords is fixed with inevitable lack of uniformity by the builder, therefore they are

Band built tires are more easily and conveniently built. The progress of building is at all stages readily controlled and inspected, with consequent better workmanship, and greater output. The building time is reduced one-half.

The flat band system of tire building is the latest advance in tire building methods, requiring lessened expense for factory equipment, economy of production and full control of structural details.

BALLOONS FOR RADIO AERIALS

A novel use for rubberized kite balloons is for suspending radio aerials. Incidentally, it has been demonstrated with the balloons that even a single wire suspended vertically will take the place of several stretched horizontally and make receiving more distinct. The successful perpendicular antenna experiment was made recently at Burbank, California, by R. W. Coburn, assistant secretary of the local chamber of commerce, and Roy Knabenshue, a well-known aeronaut. The balloon used was of thin, rubber-treated linen, 14 feet long, 4 feet in diameter, weighing 5 pounds, with a gas capacity of 150 cubic feet, 10 pounds lifting power, and a gas leakage of but 1/10 of 1 per cent. in 24 hours.

Advantages claimed for the balloon aerial are that it is portable, can be made for about $20, is easy to set up, will withstand heavy winds, and can lift antennæ to practically any height so as to receive or broadcast within an almost unlimited radius. Another experiment will be made soon with a balloon capable of lifting 3,000 feet of wire. Meanwhile a patent has been applied for and a factory is being planned in Burbank for the making of moderate-priced balloons.

RUBBER-COVERED WIRE FOR UNDERGROUND STREET-LIGHTING

That rubber-covered wire for underground street-lighting service gives perfect satisfaction is evidenced in a report of an installation laid down four years ago. The wire in question (No. 8) was rated at 5,000 volts with 7/32-inch rubber insulation (30 per cent Pará rubber) and was used in a 2½-inch fiber duct laid between the lamp pedestals, each length of wire being pulled from one lamp to the next. Although some of these conductors have frequently lain in water or ice, the service has been satisfactory.

Chicle Cultivation in Mexico and the Far East

THAT the application of modern methods in cultivation would soon result in a great increase in the production of chicle for the chewing gum and other industries is the consensus of opinion among investigators who have been studying the possibilities of this source of supply. In Central America chicle is obtained chiefly from the chico-zapote, although there are several other trees growing wild in Mexico, Guatemala, and Honduras that yield fair amounts of the gum. The chico-zapote (*Achras sapota* of Linnæus) has for many years been cultivated to a degree throughout Southern Mexico.

Closeup of a Marcot

There are two varieties, the red and the white chico-zapote. The white tree averages 12 meters in height and yields as high as 6 pounds of gum, while the red reaches but 8 or 10 meters and yields seldom more than 3 or 4 pounds. The trees bear pear-like edible fruits 2 to 3 inches long. They yield latex most freely in a warm, moist climate, thrive best in elevations between 150 and 1,200 feet, and in the soil of valleys and undulating lands along the river meadows at the foot of the mountains.

While most cultivators raise the zapote from seed planted in partly-shaded nursery beds close to a stream, and transplant the seedlings when 18 to 24 inches high, the tree is also propagated from cuttings, suckers, and by layering. It is a hardy grower, and but one or two light weedings suffice yearly. While the tree may be tapped after the fourth or fifth year, better results are obtained by waiting until the sixth or seventh year. The tree lives 100 years and then, or before, it can be used for fine timber. The gum is extracted from the leaves, unripe fruit, and bark. It is said that 3,200 pears are used in boiling out a pound of gum. The bark is cut and the latex collected in much the same way as in tapping rubber trees. The juice thus obtained is heated until it foams, and the foam is stirred until it subsides and the gum's volume is reduced one-half. It is then washed and formed into blocks of from 2 to 12½ pounds.

The cost of planting the chico-zapote varies very much. One estimate gives the expense of a plantation of 100 acres from the start to production (about six years after transplanting) as follows: Clearing the land, $600 to $800; nursery, $250; planting, $600; weeding, six years, $1,200; fencing, $50. A side crop, as of Indian corn, may more than meet the plantation cost. Estimates on gathering and clearing the gum range from 10 to 20 cents. A good grade of chicle now brings from 62 to 65 cents per pound in New York.

It is believed that the gum yield of the chico-zapote could be considerably increased were budding or marcottage practiced as is done with the sapodilla, or chiku (Malay) in the Federated Malay States. On one small plantation in Ipoh, Perak, F. M. S. owned by Charles E. Cumming, mining and planting engineer, considerable progress has been made along this line.

Chicle Grown for Fruit and Young Plants

Propagation by Marcottage

Estimating Cost of Mechanical Rubber Goods

Summary of the Fundamental Departments—Washing, Drying, Milling and Calendering

By Joseph J. Dawson

THE question that is confronting every manufacturer today is not, "Have I an adequate cost system?" but, "How am I equipped from a cost standpoint to secure new business?" This condition is more evident in mechanical rubber manufacturing than in any other line of industry. The consumers of mechanical rubber goods are continually demanding new and varied products, in the inevitable change from present materials used to the more economical one—rubber.

Contrary to the generally approved idea, that the factory superintendent should be responsible for estimates, we believe that he should only give his approval or suggestion to the action of the cost department, and that the supervisor of costs, especially in the rubber business, should be equally as practical, speaking from a manufacturing point of view, as either the factory manager or superintendent. Accordingly, it is the intent of this article to explain, briefly, the procedure necessary to determine estimated costs that are both dependable and practical.

In the manufacture of industrial rubber, the raw materials consist of crude rubber, minerals, fabrics, sundry inserted articles, such as brass bushings, wire, etc., each one subdivided into its various classifications, stocked and perpetually inventoried.

The best practice has proven that the most dependable method for costing the first five operations in rubber manufacturing, namely, washing, drying, compounding, milling and calendering, is the pound basis. It is not our intention to explain or indorse any particular type of cost system, but simply to show the information that is necessary and to mention component parts of the cost

COMPOUND FORMULA

FOR S. G.	TENSILE	STRETCH	REMARKS	COMP. NO.

LBS.	OZ.	MATERIALS	COST	COST	COST	COST
		COMP. DEPT.				
		MILL. DEPT.				
		TOTAL COST				

Fig. 1

Form for Compounds

system only wherein we must depend upon them for this information.

As all estimating systems are based, to a great extent, on past performances, naturally, unless the cost system is adequate and functions properly, the resulting estimates are of no avail.

The fundamental formula governing all cost estimating is as follows:

$$\left.\begin{matrix}\text{Material}\\ \text{Labor}\\ \text{Manufacturing Overhead}\end{matrix}\right\} = \text{Manufacturing Cost} + \left\{\begin{matrix}\text{Administrative Overhead}\\ \text{Selling Overhead}\\ \text{Corporate Overhead}\end{matrix}\right\} = \text{Total Cost.}$$

The first consideration is an explanation of methods for arriving at material and labor costs. For the present, only the five departments before mentioned will be considered, and the production statistics and direct labor information established, upon which to build our estimating records.

Washing and Drying

When crude rubber is received it contains impurities and moisture, which must be removed before it can be used for manufacturing. As it is purchased with these foreign substances as a part of it, we must take into consideration loss of weight through shrinkage. Weights must be obtained before washing and after drying, and in the case of plantation rubbers, which do not require the washing operation, before and after drying. The total cost of the rubber handled, plus the direct labor and manufacturing overhead, which will be considered later, divided by the net weight

COMPOUND TICKET	COMPOUND TICKET
COMP. NO. _____	COMP. NO. _____
DATE MIXED _____	DATE MIXED _____
WEIGHED BY _____	MIXED BY _____
CHECKED BY _____	MILL NO. _____
SEND TO OFFICE DAILY	SEND TO OFFICE WHEN MILLED

Fig. 2

Compound Ticket

of rubber resulting after the operations are completed, gives us the pound cost at which the rubber must be charged to compounds.

Compounding and Milling

The compound formula is the control for all operations of the compounding and milling departments. A convenient form for this work is shown in Fig. 1. This record should emanate from the development department and should be made in triplicate, one copy for the development department, one copy for the cost and estimating departments, and one, preferably on cards, for the compounding department. As serious objection is often raised against allowing formulæ in too many hands, it would be well to use a secret code for this work. Cost records may be kept, materials purchased, stocked, and used, by code numbers, which would preclude their identity being known anywhere within the organization.

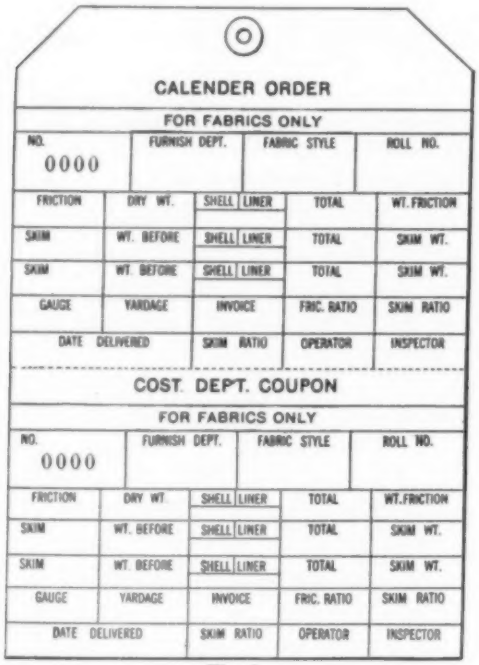
It might be said here, that no cost or estimating department can properly function unless provided with a copy of all formulæ. It will be noted that this form provides space for extension of material prices, and complete calculation of compound cost, and allows for four changes of market prices or labor rates: New cost figures for use of the estimating department should be compiled upon each market or labor change, or if no change takes place, should be verified at least every three months.

Each batch of stock weighed out should be provided with a compound ticket (Fig. 2), one stub of which is used for production statistics, for the compound department, and the other stub, for the same purpose, for the milling department. The material cost of the compound, compiled from the prices and quantities of the materials comprising it, plus the direct labor and manufacturing overhead required to pass it through the compounding and milling departments, divided by the amount of compound mixed, gives the cost per pound of the stock, when it is ready for calendering.

Calendering

When the compound is run through the calenders it becomes gum stock, or when run in conjunction with fabric it becomes

friction stock. In the case of gum stock, the value of the compound, computed at the cost obtained after milling, plus the labor and manufacturing overhead necessary to pass it through the calenders, divided by the amount produced, gives the pound price of the stock, when it is ready for use in manufacturing.



CALENDER ORDER

FOR FABRICS ONLY

NO.	FURNISH DEPT.	FABRIC STYLE	ROLL NO.
0000			

FRICTION	DRY WT.	SHELL	LINER	TOTAL	WT. FRICTION
SKIM	WT. BEFORE	SHELL	LINER	TOTAL	SKIM WT.
SKIM	WT. BEFORE	SHELL	LINER	TOTAL	SKIM WT.
GAUGE	YARDAGE	INVOICE		FRIC. RATIO	SKIM RATIO
DATE DELIVERED		SKIM RATIO		OPERATOR	INSPECTOR

COST DEPT. COUPON

FOR FABRICS ONLY

NO.	FURNISH DEPT.	FABRIC STYLE	ROLL NO.
0000			

FRICTION	DRY WT.	SHELL	LINER	TOTAL	WT. FRICTION
SKIM	WT. BEFORE	SHELL	LINER	TOTAL	SKIM WT.
SKIM	WT. BEFORE	SHELL	LINER	TOTAL	SKIM WT.
GAUGE	YARDAGE	INVOICE		FRIC. RATIO	SKIM RATIO
DATE DELIVERED		SKIM RATIO		OPERATOR	INSPECTOR

Fig. 3

Form for Calendered Fabrics

In the case of friction stock (Fig. 3), it is necessary to weigh the fabric, before and after drying, in order to compensate for loss in weight by drying, as fabric is purchased at the invoice weight. After the fabric is frictioned, the rubber weight is determined, by deducting the dry weight of the fabric, plus the shell and liner, from the total weight of the roll.

The value of the fabric (invoice price), plus the value of compound, computed at the price determined after milling, plus the direct labor and manufacturing overhead necessary to pass the stock through the calenders, divided by the total weight of the roll (fabric and compound only), gives the pound price of the friction stock, when ready for manufacturing.

The percentage of rubber to the invoice weight of fabric is determined and placed upon the cost department coupon. This record is called the friction ratio, and will be a very important consideration when the estimating of cost for hose and belting are described in a subsequent article.

Overheads

There are several methods of determining the proper distribution of manufacturing overheads, namely: (1) Percentage to direct labor; (2) Machine hour rates; (3) Fixed charges; (4) Pound basis on materials.

The first method mentioned is by far the best, unless labor rates are fluctuating to such an extent as to make it impractical. In that case, the machine hour method is always dependable, the only objection to this form of overhead distribution being the fact that, should the factory be running spasmodically, it causes rather annoying charges to the reserve accounts.

A combination of the first mentioned method and the last two, is sometimes very advantageous. Of course the distribution of overheads is a matter that the directorate of an organization must decide for themselves, after careful consideration has been given it by their supervisor of costs. For the estimating of overheads, the cost system is the basis of reference, and upon its accuracy depends the success of the results.

The above holds true for selling, administrative and corporate overheads, but the more practical method of distributing these is on a percentage of the cost of sales, using past performances as a basis. By cost of sales is meant the manufacturing cost of articles sold. This method is particularly adapted for factories producing other lines of finished products, in addition to the manufacture of industrial rubber, or those producing two or more radically different finished articles in rubber, such as mechanicals and tires.

April Rubber Exports Heavy

With a total value of $3,702,748, exports of rubber manufactures from the United States in April, though $613,428 less than in March, were far above any other month since the 1920 boom period. In April, 1922, the value of exports was only $2,823,099. Exports during the first four months of this year have followed the same trend as during the first four months of 1922. With a similar tendency for the remaining months of the year, the 1923 shipments would easily surpass $40,000,000, as compared with $33,450,832 in 1922. The single factor most responsible for this increasing trade, according to the Rubber Division of the Department of Commerce, is the apparent ability and willingness of American tire exporters to sell at competitive prices in every foreign market. At approximately equal prices the recognized high quality of American products will assure their increasing sale abroad.

The unit value of automobile casings exported in April set a new low record of $10.28, compared with $10.59 in March; the unit value of inner tubes dropped from $1.65 to $1.56. Canvas rubber-soled shoes were valued at 72 cents per pair, as compared with 75 cents in March; rubber packing at 45 cents per pound, as compared with 51 cents in March; and rubber thread at 98 cents as compared with $1.03. Solid tires for motor trucks, rubber soles and heels, rubber hose, and druggists' rubber sundries showed no significant price variations, but the value per pair of rubber boots increased from $2.97 in March to $3.16 in April; rubbers from $0.82 to $1.02 and rubber belting from 50 cents to 58 cents per pound. (For price variations during 1922 see Commerce Reports, May 15, p. 427.) While export prices depend on many variable factors, it may safely be stated that tire prices in all export markets are now at record low levels with no visible sign of upward revision by leading competitors. The only evidences of price increases in other products are to be noted in the unit value of exports of rubber boots, rubbers, and belting.

WESTINGHOUSE SECURES $15,000,000 CONTRACT

A contract involving the electrification of 213 miles of the Virginia Railway between Roanoke, Virginia, and Mullens, West Virginia, almost half the entire line of the road, and representing an expenditure of $15,000,000, was recently awarded the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania. The work, it is estimated, will take two years to complete, while the order represents the largest single railroad electrification contract ever placed, according to Westinghouse officials.

NOTWITHSTANDING LIMITED OPPORTUNITIES FOR SCIENTIFIC research, women have secured approximately 5,000 patents during the period from 1905 to 1921 inclusive. In one department alone, that of automobile tires and tire attachments, women have been granted 39 patents, or 11.3 per cent of the whole number issued in connection with this line of work.

Dollar Bills of Rubber Paper[1]

Elastic Currency Issued by the New Haven County Bank

MAKING money in rubber dates back nearly one hundred years; making it of rubber nearly as far. The former is still extensively practiced; the latter only in the most limited way. In fact, the only actual rubber money in use today is the hard rubber coin of the states of Central America. With the present world-wide interest in rubber paper, magazine, book, and even newspaper, the subject of rubber bank bills comes again to the front. The suggestion for such use came from the alert mind of Charles Goodyear. It is probable that he was not familiar with the modern phrase "elastic currency," but that is what he tried to bring about,—not very elastic but dampproof, sanitary, and durable. His effort to interest bankers did not meet with a particularly cordial reception either in the early stages of his work or even when he had proved the possibility of such production. He was of course dealing with state banks who could do practically what they chose in issuing currency. They, however, were just as stiff-necked as bankers of today and hated innovations. The primal difficulty was in the rubber paper itself.

The indefatigable inventor, however, went ahead in the production of a rubber bank note paper that should pass muster. The requirements were lightness, toughness, the ability to take ink clearly, the quality of so holding the impression that water, acids, or alkalies should not affect it. The early experiments involving the use of earthy materials and metallic oxides did not bring about the desired result. In all cases the product possessed too much elasticity. The primary mixtures which were based upon the "triple compound"—that is, the Goodyear Vulcanization patent—consisting of rubber, white lead, and sulphur were of no use. The vulcanized sheet even if heavily loaded with magnesia was black or at best a dirty brown. Moreover, the free sulphur "bloomed," covering the surface with a misty film most difficult to remove.

After many experiments a compound consisting of rubber, magnesia, finely divided white cotton fiber or "flock," and a very small amount of sulphur was evolved. This was sheeted very thin and cut up into small squares. These were placed between smooth metal plates, put under a powerful press, and left for several days. Then they were taken out and given the old fashioned dry heat cure that lasted some seven hours. This was followed by exposure to the sun for several hours and another pressing.

The vulcanizer called the "heater room" was a closet separated from the main factory building for the sake of safety. It was some eight feet long and six feet wide. It was double walled, built with boards tongued and grooved, the air space between the walls lined with paper. The furnace for heating was beneath the heater and the fuel used was hickory or rock maple wood. The floor was of iron plates from which rose four heating pipes fitted with dampers the ends of which projected above the roof. In the door of the heater was set a pane of glass so that the thermometer which hung inside could be read without opening the door.

The product was acknowledged to be as good, indeed better than any bank note paper in existence. It took ink perfectly, could be washed, would not tear, and was but a trifle heavier than ordinary paper. The bankers, however, put the inventor off. Some even said the product was too good; that it was to the bank's advantage for the bills to be less durable. The cost of the product also stood in the way of its acceptance. Finally the New Haven County Bank printed up a few dollar bills, which were cautiously put into circulation. To Mr. Goodyear's disappointment they were received with the mildest sort of enthusiasm or not noticed at all. The editor of the New London (Connecticut) "Star," in 1847, who evidently had a scent for news and saw in the rubber dollars an interesting paragraph, wrote:

"I have been shown a one dollar bill, of the New Haven County Bank, genuine, the paper of which was of india rubber manufactured in Lisbon. It was slightly elastic, but little thicker than the ordinary paper, and perfectly impervious to water. Indeed to so great perfection had it been brought, both in the filling up and in the ink used for the signatures, that it seems to have defied the common and even some uncommon methods of obliteration. It has been soaked and boiled in strong potash lye with scarcely any perceptible effect."

Goodyear left no record of the number of the bills issued or circulated. Samuel Felton, the veteran superintendent of the Hayward Rubber Co., told the writer that one of the directors of the company possessed one. Whether, however, it was Governor Buckingham, James Carew, or William Hayward, he did not recall. Lewis Elliott, also a veteran, recalled seeing one and knew about the difficulties experienced in making them. He was also sure that the work was done in Naugatuck. Emory Rider possessed one but destroyed it in trying to find out as nearly as he could what it was made of. Careful research fails to disclose even one of the rubber paper dollars. The fact that they existed is, however, beyond dispute. Perhaps, and this is by no means an idle thought, rubber latex paper for all bank notes may one day become an accomplished fact, and for the good of the users of paper currency, a product that contains a goodly percentage of caoutchouc.

The Boston Herald Adds Its Mite to Rubber Paper Possibilities

ACCORDING TO COMMERCE REPORTS, SALES OF AMERICAN-MADE elastic webbing totaled in March, 1923, 17,223,000 yards, as compared with only 12,307,000 yards sold in March, 1922.

[1]The details of this story are from notes of conversations along in the '80's between the Editor of THE INDIA RUBBER WORLD and pioneers in the rubber trade, contemporary with Charles Goodyear. Those who knew of the rubber dollar bills were Lewis Elliott, superintendent of the Candee Rubber Co., New Haven, Connecticut; Samuel Felton, superintendent of the Hayward Rubber Co., Colchester, Connecticut, and Emory Rider, 52 New street, New York, N. Y.

Activities of the Rubber Association of America

Association Meetings

Mechanical Goods Specification Committee

THE Specification Committee of the Mechanical Rubber Goods Manufacturers Division met on June 1. The proposed standard American Railway Association specifications for rubber hose and axle light belting and the general instructions on standard methods of testing which were formulated jointly by the Committee and a committee representing the railroads, will be presented as "Recommended Practice" to the A. R. A. annual convention, subject to modification during the coming year and adoption as "standards" at the next convention of that organization.

The work of the Committee with the Rubber Goods Committee of the Federal Specifications Board at Washington, in the coordination of Federal specifications for mechanical rubber goods, was reviewed, and several changes in certain existing and tentative specifications were recommended. This action was followed by a conference on June 14 between a sub-committee of the Association's Specification Committee and the chairman of the Federal Board.

Cycle Tire Committee

On June 5 the Cycle Tire Committee of the Tire Manufacturers Division met at the Yale Club, New York. The committee recommended to the Cycle Trades of America, an organization representing bicycle manufacturers, the adoption of certain tire sizes as standard. It is believed that action on this matter by the Cycle Trades of America will be taken at its September meeting.

The Committee also discussed the need for the improvement in adjustment conditions on bicycle tires, and recommended to the Executive Committee of the Tire Division that an educational poster on bicycle tires, somewhat similar to the "Are You Abusing Your Tires?" poster which relates to automobile tires, be printed and distributed to bicycle tire dealers throughout the country.

The elimination of butt-end bicycle tire tubes, the increasing requests received by the manufacturers for donations of motorcycle tires for races, etc., and several other matters relating to the bicycle and motorcycle tire trades were discussed.

Board of Directors

The postponed May meeting of the Board of Directors of the Association was held on June 6, at which matters of a routine nature connected with the work of the organization were considered.

Foreign Trade Division

The Foreign Trade Division held its regular meeting on June 12. The Spanish, French and British tariffs, as they affect the importation of American-made rubber goods, received attention.

The Spanish edition of the association's educational pamphlet entitled "Why Straight-Side Tires Are Better," will be distributed direct to dealers in South America by the export departments of the individual members of the division, instead of from the association office, the plan followed in previous instances. The Spanish edition of the poster "Are You Abusing Your Tires?" will be distributed to dealers in Cuba and Porto Rico in the same way.

Future meetings of the Division will be conducted along convention lines; i. e., the reading of papers by individual members on specific phases of rubber goods exporting and round-table discussion of it by those present. The next meeting will be held in Akron during the latter part of July.

Fabric Manufacturers Division

The Automobile Fabric Manufacturers Division met at the Yale Club on June 25. Decision was reached to broaden the scope of the monthly statistics which are being compiled by the association office covering the production and sale of auto fabrics, and, at the request of the Bureau of the Census at Washington, to furnish the Bureau with the monthly grand total figures on production.

THE RUBBER PRESERVING CO., 752 OTIS BUILDING, CHICAGO, Illinois, is marketing a product called "Kepuruber," a patented formula in liquid form, sold in 1-pound tins, which, it claims, overcomes the chemical action which causes rubber to deteriorate through oxidation. Applied with a brush or soft rag, the manufacturers say, it will maintain the original toughness of new rubber and protect it from friction and heat, and will restore old rubber to service.

THE QUAKER CITY RUBBER CO., PHILADELPHIA, PENNSYLVANIA, is making a laminated, steam cure spliced inner tube which it claims is practically indestructible. A section cut from a 3½-inch tube can be stretched more than two feet, without injuring its elasticity. While stretched it can be deeply nipped with scissors without tearing or ripping.

Report of Inventory—Production—Domestic Shipments of Pneumatic Casings—Inner Tubes—Solid Tires, Etc.

	Pneumatic Casings				Inner Tubes				Solid Tubes			
Month	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments
April, 1922	65	5,464,336	2,401,187	2,086,651	65	7,230,096	2,650,573	2,329,343	11	173,748	46,664	52,309
May, 1922	65	5,523,095	2,721,503	2,639,273	65	7,189,552	2,970,696	2,938,947	11	170,904	57,640	60,711
June, 1922	64	5,042,147	2,838,890	3,133,260	64	6,186,534	3,130,629	3,973,679	11	169,808	66,089	63,408
July, 1922	63	4,834,106	2,476,636	2,695,095	63	5,675,839	3,068,199	3,630,744	11	176,375	71,505	60,425
August, 1922	63	4,629,392	2,905,209	3,029,823	63	5,207,228	3,808,224	4,220,055	11	189,698	84,313	69,435
September, 1922	64	4,612,037	2,504,744	2,502,106	64	5,164,757	3,501,442	3,558,971	11	200,016	82,767	66,797
October, 1922	64	4,682,958	2,674,662	2,588,770	64	5,488,033	3,787,758	3,420,680	11	213,942	85,480	71,275
November, 1922	62	4,964,976	2,733,134	2,379,708	61	6,210,053	3,850,908	3,075,023	11	234,684	85,775	61,466
December, 1922	59	4,599,208	2,656,942	2,934,079	59	5,732,125	3,411,074	3,825,949	10	244,061	77,221	64,570
January, 1923	62	4,695,916	3,127,270	2,994,297	62	5,838,310	3,951,885	3,748,651	11	262,462	83,343	60,611
February, 1923	60	5,224,387	3,217,987	2,588,639	60	6,771,958	4,039,202	3,001,697	11	270,191	75,457	63,394
March, 1923	58	5,670,601	3,865,726	3,322,637	57	7,740,945	4,875,414	3,828,315	11	265,843	79,788	77,144
April, 1923	56	6,088,272	3,539,326	2,976,160	55	8,394,184	4,259,558	3,535,635	11	260,631	71,468	72,609

"Production" and "Shipment" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.

"Shipments" includes only stock forwarded to a *purchaser* and does not include stock forwarded to a warehouse branch, or on a consignment basis, or abroad.

Compiled by The Rubber Association of America, Inc.

Practical Recovery of Rubber Solvent

By P. Wilcox Gumaer[1]

WHAT are some of the questions that the subject of solvent recovery brings to the mind of a factory manager? Stated generally the first one is: Can it be satisfactorily and economically applied to my particular problem? Some of the factors which determine the answer to this question when applied to a particular case are: Economy, when considering the amount and kind of solvent used; effect on the quality of the goods; interference with new production; supervision requirements; purity of the recovered solvent involving the necessity of another process before re-use; operating features.

Economy

What is the smallest amount of a particular solvent that it will pay to recover under various conditions of use? The factors that must be considered are: Cost of the original solvent; cost of operation; cooling water; motive power; chemicals; cost of supervision; percentage recovery obtained; cost of repairs; first cost of apparatus; interest and depreciation on the first cost.

There are so many kinds of solvent used and so many methods of use that the question of economy appears to be complicated. It has been carefully worked out, however, and the general statement may be made that it will be economical to install the self-contained condenser method of solvent recovery when the solvent used per hour on one machine costs one dollar or more. Under certain conditions, even a smaller amount will pay to recover. It is necessary, when the amount used is under one dollar an hour a machine, to make a detailed calculation of the particular case.

Quality

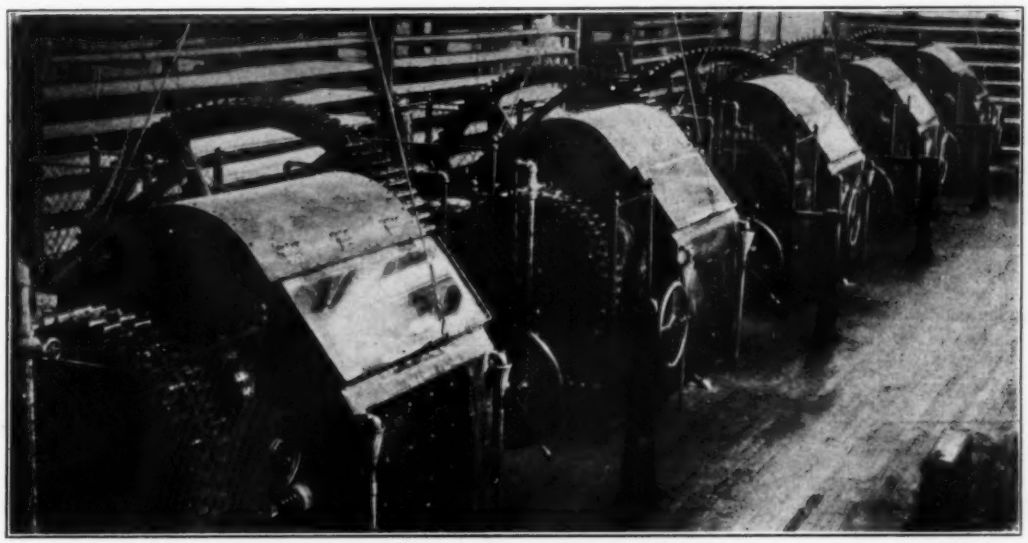
The product from which the solvent is evaporated is subjected to nearly the same conditions with the solvent recovery apparatus as without it. To recover an appreciable part of the solvent it is necessary to wholly or partly enclose the heating elements and the product during the process of drying. Care must be taken in the design of the equipment so that the additional heat available, due to the enclosure of the heating elements, will not vulcanize the rubber or cause a deterioration in the fiber used in the product. This defect will not occur in properly designed machines, but if it should it is easily remedied by lowering the steam pressure or reducing the amount of heating surface, and when once adjusted there can be no further damage to the fabric.

Closing the drying chamber to the atmosphere, with only a narrow slot for the fabric to pass through, will tend to make the drying process independent of atmospheric conditions. This condition obtains in the drying of dipped goods, where the tendency to blisters is thereby avoided.

Undoubtedly, the quality of the product is not impaired by the installation of solvent recovery equipment and it may in certain cases be bettered by more uniform drying conditions.

Production

To build a casing around the drying space, whether steam coils, hot plates or a steam-heated roller, appears at first sight to be a big disadvantage. A few months of trial, however, shows that the product can be turned out at the same rate and sometimes faster, due to more rapid drying.



Solvent Recovery Apparatus Applied to Packing Calenders

Machines have been in satisfactory use over three years by operators who at the start claimed that they could not turn out the goods unless they could see the material during the whole time of drying.

Supervision

Former methods of solvent recovery, to be operated at their best efficiency, required at least the part time attention of a skilled chemist. The self-contained condensation method of recovery requires no expert supervision, any more than a steam radiator requires supervision. To operate the solvent recovery apparatus, cooling water is turned on when the machine starts, and is left on for about a half an hour after shutting it down. This is to condense the vapors left within the drying chamber. Cooling

[1] President, Benzine Condensation Co., 220 W. 42nd street, New York, N. Y.

water, upon leaving the cooling coils, comes out into a funnel so that the operator may at all times know that the water is running. Care to shut down the equipment, in case the supply of cooling water should be cut off, and keeping the drying compartment doors tightly closed when operating, are all that is necessary to obtain a high percentage of recovery.

Recovered Solvent

The solvent vapors are heavier than air at the same temperature and fall rapidly to the bottom of the drying chamber where the cooling coils are located. The gases are quickly cooled below their boiling points by contact with the coils and are condensed in the same manner that steam is condensed in a surface condenser. After the apparatus is in operation a short time the greater part of the air is displaced so that the drying chamber contains nearly pure solvent vapor which condenses very rapidly. As no chemicals or other deleterious substances come in contact with the solvent, either in vapor or liquid form, there can be no impurities in the recovered solvent.

Pure substances, or rather solvents with definite boiling points, such as c.p. benzol, tri-chlorethylene, carbon tetrachloride, ether, etc., have the same chemical analysis after recovery as the original solvent.

Careful determinations show that in ordinary drying operations, such as spreading and impregnating, it is not practical or necessary to remove during the drying operation every trace of the solvent. The fabric may feel and appear dry, yet contain 10 to 15 per cent of the original solvent. This residue solvent is probably held in the fibers in much the same way that a bone-dry fabric will absorb a considerable amount of water vapor before it feels or looks wet. Ordinarily 5 to 10 per cent of the applied solvent remains in the product when it leaves the spreader or impregnator.

When gasoline or naphtha is applied to the fabric and then evaporated, the lighter or lower boiling point fractions evaporate first and the heavier fractions last. The portion of the solvent remaining in the goods is, therefore, composed chiefly of the heavier fractions. Removing part of the heavier fractions from the gasoline or naphtha results in recovered solvent showing a higher test than the original solvent.

Sometimes moisture in the fabric or a very slight steam leak in the coils will give a small percentage of water in the recovered solvent. An automatic separator, however, removes every trace of water from the solvent before it enters the receiving tank. By the installation of two or more separators non-miscible solvents can be separated from each other as well as water from the mixture. For example, an installation is in successful operation where a mixture of gasoline and tri-chlorethylene is used for solvent. The gasoline is first separated from the recovered solvent and then all trace of water is removed, leaving pure tri-chlorethylene. As no chemicals are used in this separator, it requires no attention, being entirely automatic and fool-proof.

Simplicity of Apparatus

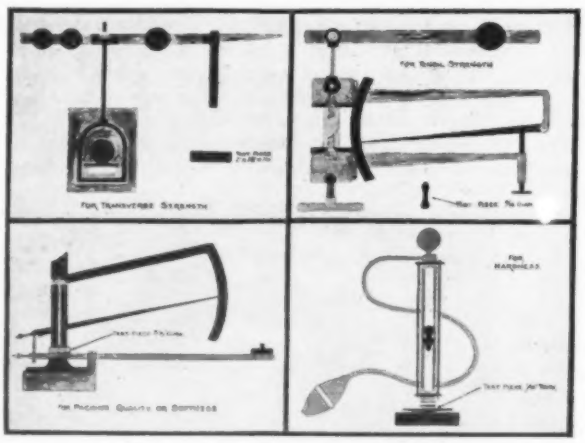
The ease of operation is shown in the self-contained condenser method of recovery as applied to a spreading machine. Cooling water at a temperature of 70 degrees F. or less, passing through the water jacket, condenses the solvent vapor inside the drying chamber. From 15 to 20 gallons of cooling water are required to condense one gallon of solvent. This water becomes heated to 75 or 80 degrees F. and, if desired, can be used again for other purposes. Another practical demonstration is the application of solvent recovery machines to sheeter calenders in the manufacture of asbestos packing. These machines have been in use for two years and have given entire satisfaction and a high percentage of recovery.

ACCORDING TO COMMERCE REPORTS, THE RECEIPTS BY THE UNITED States of rubber from Eastern Asia, although very much smaller in 1921 than in 1920, were more than twice the 1914 volume.

Dental Rubbers[1]

In general, the manufacture of dental rubbers or vulcanite for dental purposes is conducted in essentially the same manner as rubber for other purposes. However, special qualities of composition are necessary for satisfactory dental vulcanite. They are as follows: packing quality, vulcanizing capacity, strength, lack of shrinkage, acceptable color, finish and convenient form. These requirements are susceptible of tests some of which are made by means of apparatus herewith illustrated.

Packing quality or softness is determined with an instrument in which a sample of uncured rubber sheet is placed for penetration by a needle under standard conditions of time, temperature and pressure. The depth of penetration is recorded, and the sample removed. The ability of the rubber to force the needle outward measures the softness or quality of staying where packed in place, which is its freedom from elastic quality. The softness of dental rubber is limited to that degree which permits the sheet rubber to be packed between holland without its adhering to the cloth.



Machines for Testing Dental Rubber

The vulcanizing quality is regulated by the amount of contained sulphur, time, temperature and pressure used, and mass to be cured.

Strength tests are made on cured vulcanite in a tensile machine of the form illustrated. Dental base rubbers have a tensile strength of about 7,000 pounds per square inch. Transverse strength is determined on a section of definite thickness resting on supports in a machine such as shown and applying to the strip a dead weight load bearing on a knife edge against the rubber. The deflection caused by this load and recovery of the sample after its unloading are read from a pointer and scale.

Hardness is best measured by means of a scleroscope of the general form illustrated, in which the rebound of a drop weight is read against the scale of the instrument and thus indicates the hardness of the test piece.

In order to hold the teeth solidly in a dental plate the rubber composition used must have practically no shrinkage on curing.

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[1] Abstracted from History and Development of Dental Rubbers. By Charles Henderson, sales manager, The S. S. White Dental Manufacturing Co., Philadelphia, Pennsylvania.

ENGLISH IMPORTS OF AMERICAN-MADE TIRES INCREASE

England's imports of American-made automobile tires, totaling in value $197,879 in January, 1923, declined to $182,340 in February. The March figure represents, however, a surprising increase, the total being $518,267, with only a slight decline in April to $514,718.

The Crystallization of Sulphur in Rubber and the Phenomenon of Blooming. I[1]

Crystallization of Sulphur from Solution, Globular, Dendritic and Rhombic Forms. Cause and Prevention of Blooming

By Herbert A. Endres

THE mechanism of the phenomenon of "blooming" or "sulphuring up," as it is called, has been a much debated subject. In spite of its importance, little reference is given to the subject in the literature. Weber[2] is, beyond doubt, responsible for the pioneering work, and later Loewen[3] studied the reaction between sulphur and rubber under the microscope. He showed that sulphur will diffuse through rubber, which indicates that it is not present in the colloidal state, contrary to Weber's ideas. He also showed that the excess of sulphur dissolved in rubber separates out in globular form on cooling, and these globules later crystallize. During the same year Skellon[4] published his work on the migration of sulphur in rubber and showed that sulphur migrates upwards or downwards with equal facility.

The work of Loewen and Skellon, together with that of Venable and Greene[5], who measured the solubility of sulphur in rubber by a diffusion method, furnishes conclusive evidence that sulphur dissolved in rubber is present in true solution and not in a colloidal form. Bruni[6] has determined the solubility of several crystalline substances, other than sulphur, in rubber and found that rubber behaves as an ordinary solvent, forming true saturated solutions of these substances.

The investigation here described was an effort to obtain definite information relative to the changes that the free sulphur undergoes in rubber before and after vulcanization, with special reference to the former. The following systems were investigated: (1) sulphur-benzol, (2) sulphur-benzol-rubber, and (3) sulphur-rubber. It was quite impossible to study these changes microscopically by means of microsections. A very convenient method of obtaining thin unvulcanized rubber sections is by the evaporation of cements, and this was the method employed. In order to determine the effect of benzol, the crystallization of sulphur from benzol was first studied, then introducing rubber, the crystallization of sulphur in a rubber-sulphur cement. And finally eliminating benzol, a study was made of the transformations which sulphur undergoes in rubber, using the evaporated cement films for this purpose. Furthermore, it was desired to know if sulphur undergoes the same changes in other solvents that it does in rubber.

Crystallization of Sulphur from Benzol

If a drop of a solution of sulphur in benzol is allowed to evaporate slowly, the larger part of the sulphur crystallizes directly into rhombic crystals. Some small globules of liquid super-cooled sulphur are formed at the same time, but if the solvent is evaporated sufficiently slowly, these, for the most part, will deposit on the crystals formed, and the latter will then grow at the expense of the globules. If, however, the solvent is rapidly evaporated, numerous globules will be formed, and the sulphur will be deposited as such. In this way it is possible to obtain practically all of the sulphur in the super-cooled globular form. The yield of globular sulphur is determined by the rate at which it is deposited from solution. When the rate of separation exceeds the rate of crystallization, super-cooled globular sulphur results.

FIG.1.—RHOMBIC AND DENDRITIC SULPHUR CRYSTALS GROWING IN RUBBER AT EXPENSE OF GLOBULAR SULPHUR. FIG. 2.—WELL DEFINED RHOMBIC CRYSTALS AND DENDRITES. NO GLOBULES PRESENT. FIG. 3.—CHAIN OF RHOMBIC CRYSTALS FORMED FROM DENDRITES IN PURE GUM STOCK. FIG. 4.—EARLY STAGE IN BLOOMING PROCESS. SOLIDIFIED SURFACE GLOBULES GROWING AT EXPENSE OF GLOBULES. CRYSTALLIZATION INDUCED BY TOUCHING

It has been stated that sulphur dissolved in benzol is largely colloidal,[7], but this will not account for the formation of the super-cooled globules because the same results are obtained with a solution of sulphur in carbonbisulphide, and in this case the sulphur is molecularly dispersed[8]. Likewise, as will be pointed out later, the same phenomena are observed in a solution of sulphur in rubber, which is also a true solution. On the other hand, globules of liquid super-cooled sulphur are formed when hydrogen sulphide and sulphur dioxide react in water or benzol solution, and also when "hypo" is acidified, and in these cases the sulphur is known to be colloidal.

Crystallization of Super-Cooled Globules

Crystallization of the super-cooled globules can be initiated in several ways, most important of which are: by the introduction of a small quantity of the solid phase; by shock, or other mechanical stimulus.

[1]Abstract of a contribution from the research laboratories of The Goodyear Tire & Rubber Co., Akron, Ohio, in cooperation with the California Institute of Technology. Presented before the Rubber Division of the American Chemical Society, Pittsburgh, Pennsylvania, September 4 to 9, 1922.

[2]Chemistry of India Rubber 110, 1919.
[3]Gummi Zeitung 27, 1301, 1913.
[4]India Rubber Journal, 46, 251, 1913.
[5]Journal of Industrial & Engineering Chemistry, 14, 319, 1922.
[6]Giornale di Chimica Industriale ed Applicata, February, 1921.
[7]Kolloid-Zeitschrift, 8, 197, 1911.
[8]Theoretical and Applied Colloid Chemistry, Ostwald-Fischer, 18, 1917.

Crystallization of Sulphur in a Rubber-Sulphur Cement

Sulphur for rubber mixings is usually flowers of sulphur. This form is composed of solidified droplets that show no well defined crystals under the microscope. It has a crystalline fracture, however, and is composed of rhombic sulphur, the stable form at room temperature.

A series of 10 per cent cements was prepared in benzol from rubber-sulphur mixings containing 4 to 10 per cent sulphur. Thin films of these cements showed no sulphur particles under the microscope, the sulphur all being in solution. As the benzol evaporates the sulphur separates out in super-cooled globular form. At this stage the rubber film is quite opaque and will often show a play of colors, the minute sulphur globules breaking up the light. These globules, when examined under the polarizing microscope, are seen to be composed of sulphur in the liquid condition. At room temperature (25 degrees C.) the solubility of sulphur in rubber is about one per cent and the remainder will be precipitated.

If the rate of evaporation of the benzol is sufficiently great, practically all of the sulphur is first precipitated in the globular condition. Rubber, being a highly viscous substance, does not permit rapid migration of the sulphur and crystal formation is therefore somewhat retarded. Usually after not more than 10 minutes, both the branching dendritic structure[9] of minute sulphur crystals and larger rhombic crystals are formed. These crystals serve as centers of crystallization and grow at the expense of the globular sulphur by a process of solution, diffusion and deposition. The globular sulphur, being the less stable phase and therefore the more soluble, keeps the rubber super-saturated with respect to the crystalline phase which is then deposited. A gradual change of the less to the more stable form takes place through the medium of the solvent (rubber) until a considerable region around the growing crystals has been freed from sulphur globules.

As the crystals grow, the distance between them and the super-cooled globules becomes greater and their growth becomes slower, as sulphur diffuses but slowly through the viscous rubber medium at room temperature. The remaining globular sulphur then goes to form the more rapidly growing dendritic structure, the result being a mass of dendritic crystals with rhombic crystals here and there in the centers of areas containing no crystalline sulphur.

In the presence of sufficient rhombic centers of crystallization no globules will be formed on evaporation of the benzol. The sulphur will then deposit directly on the crystals present as its solubility is exceeded. Thus, by stirring flowers of sulphur into an evaporating cement nothing but rhombic crystals will result.

Crystallization of Sulphur in Rubber

The solubility of sulphur in rubber at 95 degrees C. is about 6.5 per cent and increases to more than 10 per cent at 110 degrees C. By heating any of the evaporated cement films from the above experiments for a few minutes at 110 degrees C. the sulphur dissolves in the rubber and crystals can no longer be seen. Small globules of sulphur again appear on cooling and these then rapidly go over into the dendritic structure of minute sulphur crystals. After a larger part of the globules have crystallized the action slows up considerably and the remaining globules go over into the crystalline form rather slowly, several hours being required for completion of the action. In this case no well defined rhombic crystals are formed.

If a section of calendered stock composed of rubber and sulphur is examined microscopically the sulphur will usually be found to be present as rhombic crystals and irregular shaped fragments. The latter are particles as originally incorporated which did not dissolve, but the rhombic crystals were formed in the rubber. During milling and calendering some of the sulphur goes into solution in the rubber, the quantity depending upon the temperature and duration of the process. Upon cooling, the rubber becomes super-saturated with sulphur, which then crystallizes out onto the particles of sulphur that did not go into solution. In this way the smaller particles become well defined rhombic crystals. If the duration of the calendering process is sufficiently long, and the temperature sufficiently high, the dissolved sulphur will diffuse uniformly throughout the rubber mass and not concentrate around the undissolved fragments. Then, upon cooling, globular sulphur will be formed, especially if the stock is rapidly cooled. This, for the most part, will then be transformed into the dendritic form.

A rubber mix composed of 5 per cent sulphur and 95 per cent smoked sheet was calendered to about one mm. thickness. The temperature of calendering usually ranges between 95 degrees and 110 degrees C. If a piece of this stock is heated in an oven at 95 degrees for ten minutes nearly all of the sulphur will dissolve in the rubber. Minute globules are again formed on cooling and these go over into the dendritic crystalline form, with an occasional rhombic crystal or chain of rhombic crystals sometimes one centimeter or more in length. These rhombic crystals always form about small sulphur particles that did not go into solution during the heating process and which serve as crystallization centers. If the specimen is heated for a length of time sufficient to put all the sulphur into solution, about 30 minutes, the globules formed on cooling go over to the dendritic structure entirely and this then slowly transforms into well defined rhombic crystals by the process of rearrangement previously described.

Phenomenon of Blooming

Sulphur bloom is always composed of rhombic sulphur. Rubber containing an excess of sulphur in solution, in the globular, or the dendritic forms, is super-saturated with respect to rhombic sulphur. If rhombic crystallization is initiated at the surface of a stock in any of these cases bloom will result; most rapidly from sulphur in solution, and least rapidly by transformation from dendrites.

When a super-saturated solution is seeded, crystallization results. Likewise when rubber super-saturated with sulphur is seeded by touching or inoculating with the solid phase, crystallization results at the surface. The surface crystals then grow at the expense of the excess sulphur in solution and a dense bloom results.

Crystallization Induced by Shock

Crystallization or solidification of super-cooled sulphur globules can be caused by shock or other mechanical stimulus. If a stock is touched with a relatively cold object while the free sulphur, or a part of it, is in the globular condition, the globules so disturbed crystallize at once. The larger part of this crystallization takes place at the surface, as the globules there are most affected. The crystals at the surface then grow at the expense of the neighboring globules and after a short time a dense surface deposit of rhombic sulphur crystals is formed.

Cause of Bloom

Surface crystallization, or bloom, can be caused by direct deposition of sulphur from solution or by transformation from the super-cooled globular or dendritic forms. If there are sufficient crystal centers within the rubber mass, the bloom will be very slight. Such is the case with high sulphur stocks, 10 per cent or above. Green stocks of this nature bloom but slightly under ordinary conditions, and for two reasons: (1) sulphur particles are usually present to serve as crystallization centers; (2) if globules are present they will be so close together that the shock caused by the crystallization of any of them will cause the surrounding ones to crystallize, resulting in the solidification of the globules throughout the mass. Therefore there will be but little migration of sulphur to the surface.

[9] The dendritic form of sulphur has not been previously described. It seems quite likely that it is composed of a variety of monoclinic sulphur, this being the unstable crystalline form at ordinary temperatures.

Methods of Controlling Bloom

The tendency to bloom in both vulcanized and unvulcanized stocks depends upon the number of crystallization centers,—that is, solid sulphur particles present within the rubber mass,—and also upon the quantity of free sulphur, and goes through a maximum. A stock containing 10 per cent of free sulphur is not as apt to bloom as one containing five per cent. Also a stock containing one per cent of free sulphur or less will not bloom because in this case the quantity present is less than the solubility value for sulphur in rubber at room temperature. As the sulphur solubility increases with the coefficient of vulcanization, the latter also becomes a determining factor in vulcanized goods. Hard rubber usually contains much free sulphur but does not bloom. Due to the hardness of the material the migration of sulphur is prevented. Rubber becomes more impermeable to sulphur as the coefficient of vulcanization increases. The tendency to bloom therefore decreases, because of the slower rate of migration of the sulphur.

If the sulphur in solution in a stock after calendering or vulcanization is allowed to crystallize within the rubber, by avoiding surface contact or chilling there will be no immediate crystallization at the surface and therefore bloom will be greatly retarded, and for all practical purposes negligible. This can be accomplished, when practicable, by protecting the surface with holland or other suitable material and having both at such a temperature that no surface chilling will result.

Obviously, any process by which the amount of free sulphur is reduced to one per cent or less will prevent blooming. This can be accomplished, and without increasing the true coefficient of vulcanization, by incorporating in the mix substances which form compounds with sulphur during vulcanization and thus hold it in the rubber mass. It is to be understood that these substances do not prevent blooming in unvulcanized stocks, but may promote it by decreasing the viscosity of the latter. The various mineral compounding ingredients do not appreciably affect the changes that the free sulphur undergoes as it separates from solution in an uncured stock, and therefore it is obvious that these ingredients have no effect on the process of blooming in this case.

Charles Goodyear Honored in "The Town Hall"

Although not yet occupying a niche in America's Valhalla, the Hall of Fame, for which place he was proposed in 1920 by the late Col. Samuel P. Colt—and the next election of candidates will not be held until 1925—Charles Goodyear, the discoverer, inventor, and creator of vulcanized rubber, may soon be fittingly and lastingly honored in "The Town Hall" of New York City. Plans for a memorial in that new civic institution to the famous American who made possible one of the world's great industries are now being made by leaders in the rubber trade. The memorial will probably take the form of an endowed loge in the auditorium, and inscription thereon citing the achievements of the "Father of the Rubber Industry," who had spent a large part of his life in New York, dying in 1860 at the old Fifth Avenue Hotel.

Among the endowed loges and chairs in The Town Hall are those dedicated to the memory of Bertha F. Achelis, wife of Fritz Achelis, president of the American Hard Rubber Co., who was very active in social welfare work in New York and who with Mr. Achelis built and furnished the Lenox Hill Hospital Nurses' Training School. Another such gift to the Hall is that of William Church Osborn, commemorating the work of Edward M. Shepard, founder of the Goodyear Rubber Co. and sometime president of the United States Rubber Co. Others connected with the rubber industry who have been similarly honored are William R. Grace and Francis G. Lloyd.

The endowments provide a fund for improving the building and for paying the debt on The Town Hall, thus freeing the institution for greater service to the metropolis. Orchestra chairs may thus be made memorials for $1,000 and loges for $10,000. On each endowed chair is placed a silver plate bearing the name of the donor or other names as memorials. Among the many who have endowed chairs or loges are: A. Barton Hepburn, Frank A. Vanderlip, Henry Morgenthau, Henry W. Taft, Mrs. William H. Bliss, Mrs. Charles B. Alexander, Mrs. Andrew Carnegie, Felix M. Warburg, Mrs. Joseph H. Choate, Mrs. Whitelaw Reid, Mrs. William Barbour, and Bernard M. Baruch.

This unique institution, which aims to perpetuate one of the earliest civic establishments of the country, the New England town meeting, is situated at 113-123 West 43d street, New York, N. Y. It is a handsome structure in the heart of the great city, and in its auditorium law-abiding people of every race, creed, and class may carry on an open forum, on the principle that free, frank interchange of opinion will conduce to mutual good will and fair play in social, commercial, and government activities. It is the object of the founders to unify as far as practicable the efforts now being made by some 500 organizations striving for really constructive civic and philanthropic work; to suitably

"The Town Hall" Where Charles Goodyear Will Be Honored

celebrate national festivals and perpetuate patriotic ideals; and to afford educational and cultural lectures on art, music, literature, etc.

The Town Hall was erected by the Societies Realty Co., a holding concern for The League for Political Education. The president is Frank A. Vanderlip; vice president, Robert Erskine Ely; secretary, E. H. Outerbridge; treasurer, William R. Willcox; assistant secretary and assistant treasurer, Mary B. Cleveland; and counsel and chairman of the executive committee, Henry W. Taft.

MODEL COTTON MILL IN CHINA

One of the most up-to-date cotton mills in the world was recently put in operation at Shih Kia Chwang, Chihli, China, by the Dah Shing Cotton Spinning & Weaving Co. The electric power plant and motors were supplied by the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania.

What the Rubber Chemists Are Doing

Rubber Softeners[1]

By Paul M. Aultman[2] and C. O. North[3]

Need for Rubber Softeners

RUBBER softeners are added to mixes usually for two major reasons: 1, to facilitate milling, calendering, and tubing; 2, to cheapen the stock. Compounding softeners into rubber gives a wide variation in characteristics of both cured and uncured rubber. In the milled batch the rubber becomes more plastic and more easily worked even when extremely small amounts of some substances are incorporated. In the cured product the most notable effect usually is the lowering of the stress values of the stress-strain curve and the increasing of the elongation more than warranted either by retardation of sulphur combination or mere filling action. There is some effect on the properties of the rubber mix diametrically opposed to that of finer pigments when added to rubber. The pigments make the stock less plastic, raise the values of the stress-strain curve and cut down the elongation. This effect varies greatly, depending on the softener used. It can easily be explained by the assumption that the softeners have some action on the rubber aggregate itself.

Disintegrating Test

The method consisted of heating vulcanized rubber in the softener until total disintegration ensued. An oil bath equipped with a constant temperature controlling apparatus was used. In this bath flasks containing 150 cc. of the softener were placed. The temperature was kept at 140 degrees C. When the temperature of the softener reached 140 degrees one gram of coarsely ground vulcanized pure gum was stirred in and the time required to secure disintegration was noted. This procedure precluded the investigation of mineral rubbers or any tar-like bodies. The results also, owing to an indefinite end point, must be regarded only as approximations. Some of the materials tested were taken merely as a matter of interest.

Action of Various Softeners

The time required for the various softeners to disintegrate the rubber was practically as follows:

	Hours	Minutes	Remarks
Napthalene	0	50	
Paraffine	1	35	
Kerosene	1	45	
Paraffine oil	2		
Xylol	2	20	
Vaseline	4	30	
Aniline	5		
Ortho toluidine	5		
Palm oil	10		
Pine oil	12		
Rosin	12		
Oleic acid	12		
Cocoanut oil	15		
Stearic acid	16		
Lard oil	30		
Cottonseed oil	34		Solution not clear
Corn oil	34		
Soya bean oil	38		Solution not clear
Linseed oil	45		No change
Castor oil	45		No change

A number of other materials were tested but the results are not significant. The waxes and resins were very difficult to handle and did not give good results. It was observed that the time required for the saponificable oils evidently had some relation to the iodine absorption number, as oils having a low number dissolve the rubber much faster than those of higher absorption number.

Effect of Adding Sulphur

As sulphur is always present in practical mixes and reacts readily with terpenes, four grams were added to pine oil and the resulting solution was compared with the untreated oil as a check. Disintegration was effected in two hours instead of twelve for the untreated oil. Other oils were tried, using the same proportions. Representative results are as follows:

	No Sulphur		With 4 Grams Sulphur	
	Hour	Minutes	Hour	Minutes
Paraffine	1	30	1	30
Xylol	2	30	2	..
Cocoanut oil	14	..	4	30
Stearic acid	15	..	4	30
Aniline	5	..	2	..
Rosin oil	12	..	2	..
Cottonseed oil	35	..	10	..
Castor oil		No Solution		

The addition of sulphur in most cases accelerated the disintegration. The sulphur used might aid in swelling the jell because sulphur dissolves in rubber. The fact that disintegration itself was hastened indicates that sulphur itself acts as a depolymerizing agent. The theory that a substance acting as a vulcanizing agent should also be a depolymerizer is not contrary to the evidence, as several softeners having a strong depolymerizing action accelerate the addition of sulphur to rubber. For example, a base stock of rubber, zinc oxide, hexamethylene, tetramine and sulphur gave combined sulphur of 0.93 per cent cured 40 minutes at 290 degrees. Three per cent vaseline added raised this to 1.10 per cent and the addition of 3 per cent napthalene to 1.04 per cent. These examples are selected because vaseline and napthalene should not react appreciably with sulphur.

Swelling Test

It was thought necessary to check the observations in another way. Weighed pieces of vulcanized test sheets, approximately one inch square, were immersed in the softeners, heated to various temperatures, and after definite periods of time were taken out, excess oil removed, and then re-weighed. The weight of softener dissolved in the rubber was thus noted. Some representative results are listed below:

	Relative Volume Increase Per Cent (No Sulphur Added)	Relative Volume Increase, Per Cent (With Sulphur Added)
Napthalene	273	282
Vaseline	59	81.2
Pine oil and rosin	44	69
Aniline	39.2	52.5
Cottonseed oil	31.3	47.0
Castor oil	.....	.....

These samples were heated to 100 degrees C. for 3½ hours.

Effect of Mixtures

The effect of mixed oils was tried by the disintegrating method. In general, if both oils had even slight depolymerizing action the time required was nearly an average of the time taken by each of the ingredients separately. For instance, vaseline and cottonseed oil required 4 hours, 30 minutes and 34 hours respectively to dissolve the rubber, while a 50-50 mixture of the two required approximately 20 hours. On the other hand, oils having no effect on the rubber, such as linseed or castor, almost totally retarded the action of other oils with which they were mixed. A mixture of castor oil and paraffine heated for 40 hours caused only a slight swelling of the rubber. Another peculiar result was that nothing was found which would even slightly retard a sulphur and terpene mixture. A mixture of 70 parts castor oil,

[1] Presented before the Rubber Division at Meeting of the American Chemical Society, Pittsburgh, Pennsylvania, September 4 to 8, 1922.
[2] Lee Tire & Rubber Co., Conshohocken, Pennsylvania.
[3] Rubber Service Laboratories, Akron, Ohio.

30 parts pine oil, and 4 grams sulphur required only two hours to secure a clear solution.

Summary

The action of softeners on vulcanized rubber at the temperature of vulcanization, 140 degrees C., show wide differences in depolymerizing effect.

1. The comparative action of softeners on vulcanized rubber at the vulcanizing temperature of 140 degrees C.
2. That sulphur and accelerators aid in the depolymerization of rubber.
3. That the more advanced the state of cure the slower the depolymerization rate becomes.
4. That depolymerizing substances usually accelerate the combination of sulphur.

Accelerators and Tensile Properties

By C. B. Clark[1]

The tests given herein were specially made to determine the relative effect on the tensile properties of rubber-sulphur-zinc oxide mixing at the optimum cure obtained with each accelerator.

Test Compositions

500		504	
Pale crêpe	100	Pale crêpe	100
Sulphur	6	Sulphur	6
Hexa.	0.65	Thiocarbanilide	2.75
Zinc oxide	137	Zinc oxide	113
501		**505**	
Pale crêpe	100	Pale crêpe	100
Sulphur	6	Sulphur	6
Hexa.	0.65	Paraphenylene diamine	0.65
Zinc oxide	113	Zinc oxide	113
502		**506**	
Pale crêpe	100	Pale crêpe	100
Sulphur	4	Sulphur	6
Hexa.	1.3	Paranitro-sodimethylaniline	0.33
Zinc oxide	113	Zinc oxide	113
503		Litharge	6.5
Pale crêpe	100		
Sulphur	6		
Diphenylguanidine	0.11		
Zinc oxide	137		

		Before Aging			After aging 30 days at 65° C.			
							Load pounds per square inch	
Sample	Optimum Cure Minutes at 40 pounds	Tensile pounds per square inch	Per cent elongation at break	Abrasive resistance	Tensile pounds per square inch	Per cent elongation at break	Per cent 300	Elongation 450
500	75	3,229	598	110	1,952	475	810	1,785
501	60	3,865	650	235	2,815	520	905	1,965
502	75	3,560	640	95	2,741	530	668	1,475
503	90	2,792	649	68	2,005	500	580	1,278
504	90	2,869	618	89	1,939	479	615	1,382
505	90	3,328	629	104	2,587	476	715	1,504
506	45	3,216	606	91	2,022	486	696	1,451

[1]Technical superintendent, Somerset Rubber Reclaiming Works, New Brunswick, New Jersey.

Organic Accelerators and Plantation Rubber

The influence of organic accelerators on the vulcanizing properties of plantation rubber has recently been reported upon by Dr. H. P. Stevens,[1] using two of the commonest organic accelerators in general use, namely, thiocarbanilide and hexamethylene tetramine, sometimes known as hexa, hexamine, or H. M. T. The latter is approximately three times as strong as the former.

Doctor Stevens summarizes the results of his investigation as follows:

"So far as the results obtained to date are concerned, it may be said that thiocarbanilide and hexamine produce on the whole a similar accelerating effect on the various samples of rubber tested, and with one or two exceptions the variations in the rate of cure of the samples is appreciably reduced by thiocarbanilide and still more reduced by the use of hexamine. It should be noted that the samples chosen are prepared by methods markedly distinct from one another, and include, in addition to the ordinary smoked sheet and crêpe rubber, sprayed rubber, slab rubber and sodium silico-fluoride coagulated rubber."

[1] Bulletin of the Rubber Growers' Association, May, 1923, 292-296.

Chemical Patents

United States

MAKING VULCANIZATION ACCELERATORS. The process of making an oxidation product of a metallic salt of an organic acid, which comprises condensing dimethylamine with carbon disulphide, precipitating with an aqueous solution of zinc sulphate to form an insoluble zinc salt, and then oxidizing the precipitate.—Paul I. Murrill, Plainfield, New Jersey, assignor to R. T. Vanderbilt Co., New York, N. Y. United States patent No. 1,453,515.

UNVULCANIZED RUBBER COMPOSITION. An unvulcanized rubber composition containing crude rubber, an inert filler, finely divided active gas black forming not less than about 15 per cent of the composition, and a softening agent.—Frank Webb Stockton, Pittsburgh, Pennsylvania, assignor to Aluminum Seal Co., New Kensington, Pennsylvania. United States patent No. 1,455,893.

New Zealand

FIREPROOFING COMPOSITION. A new composition of matter for fireproofing and fire retarding, comprising a rubber gum, a varnish gum, and a fire retardant hydrolyzable compound of a metal such as an antimony salt, dissolved in a solvent.—Arthur Arent, Des Moines, Iowa. New Zealand patent No. 230,798.

The Dominion of Canada

HALOGENATED RUBBER COMPOUND. The method of treating vulcanized scrap rubber which consists in boiling scrap rubber with caustic, washing with water to remove the caustic, suspending the purified material in carbon tetrachloride, passing chlorine into the suspension, and recovering the product.—The Goodyear Tire & Rubber Co., assignee of Clayton W. Bedford and William J. Kelly, all of Akron, Ohio. Canadian patent No. 230,548.

RUBBER COMPOUNDING METHOD. The method of producing vulcanized rubber which consists in dissolving hexamethylene tetramine in water, mixing the solution with sulphur, removing the water, incorporating the mixture with rubber, and vulcanizing the rubber compound.—The Goodyear Tire & Rubber Co., assignee of Clayton W. Bedford, both of Akron, Ohio. Canadian patent No. 230,550.

Germany

Patents Issued, With Dates of Issue

376,743 (June 17, 1914). Method for making plastic masses for insulating purposes. Hermann Plauson, Burgstrasse 32, Hamburg.

CHEMICAL EXPOSITION IMPORTANT TO RUBBER MEN

More and more the rubber manufacturer must depend upon the practical knowledge of the chemist, particularly if the former wishes to keep in touch with the newest developments in the rubber industry. Especial efforts are being made by those in charge of the Ninth National Exposition of Chemical Industries, to be held September 17-22 in the Grand Central Palace, New York City, to make the occasion not only a successful one, but also the best exhibition of the kind yet offered to the public. Rubber production in all its phases will be covered, and the rubber man attending will receive information of interest regarding special machinery, new processes and operations.

SYNTHETIC RUBBER[1]

Synthetic rubber is made by polymerizing isoprene and related hydrocarbons. In the process of polymerization isoprene passes through the several states of a slightly viscid liquid to a stiffer one, to end in a hard crumbly mass. It is between the two extremes that a product is obtained most like natural rubber.

This product may be separated as a gelatinous mass from the monomeric mother substance through the addition of alcohol. In the first stages of polymerization the dispersion medium consists of the monomeric mother substance in which float the polymerized particles. In the medium and higher concentrations there seems to occur a transformation which results in the monomeric component becoming the internal phase while the polymeric form surrounds it as a gelatinous structure.

[1]An extract from "An Introduction to Theoretical and Applied Colloid Chemistry." Second American Edition, New York, N. Y. John Wiley & Sons, Inc.

SNOWFLAKE SILICA

A brand of silica claimed to be of exceptional merit as a rubber compounding ingredient is known as snowflake silica. Tests of rubber stocks in which this silica has been substituted to the extent of ten per cent of zinc oxide in the original mixings showed no decrease in tensile. The same substitution of silica for whiting affords from 15 to 35 per cent increase in tensile.

RUBBER TAPPING IN UNIQUE WINDOW DISPLAY

An interesting window display which attracted considerable attention from the passers-by was recently on view at the offices of The United States Rubber Co., 1790 Broadway, New York, N. Y. In the foreground was the life size figure of a Javanese coolie in the act of tapping a full grown Hevea rubber tree, while in the background appeared other trees of the plantation. The coolie was

Native Tapping Hevea Rubber Tree

equipped with a special tapping knife; attached to the tree was a glass latex cup, and a 10-gallon collecting can stood beside the tree. The tapping was according to the 1/3 system.

THE FOLLOWING FIGURES SHOW THAT BRITISH SOUTH AFRICA IS maintaining in 1923, as in the year previous, her position of importance as a purchaser of our mechanical rubber goods: January, $55,165; February, $19,296; March, $60,943; and April, $40,998.

The Obituary Record

Death of Horace De Lisser

Horace De Lisser, founder of the Ajax Rubber Co., Inc., and president of The Rubber Association of America, died June 27. His obituary will appear in our next issue.

Long Associated with United States Rubber Co.

The death of Philip G. Campbell, Des Moines, Iowa, branch manager, who for many years has been connected with the United States Rubber Co., occurred on June 2. In 1898 Mr. Campbell began work in the United States Rubber Company's stock room, and was for some time associated with the organization's sales forces, until his appointment in 1920 to the managership of the branch at Des Moines.

A Naturalist and Rubber Man

Horace C. Pratt, for 10 years Cleveland manager of the United States Rubber Co., died June 9 at his home in Cleveland after an illness of three months. Mr. Pratt, who had been connected with the United States Rubber Co. for many years, was born in New England in 1868. He was a member of the Camp Fire Club of America, being widely regarded as an authority on birds and wild flowers. His widow, Helen M. Pratt, and a brother, Arthur W. Pratt, of East Orange, New Jersey, survive him .

Interesting Letters from Our Readers

We Meant Walt Mason

TO THE EDITOR:

DEAR SIR: On page 555 of your June issue the writer was much surprised to note at the foot of the insert "Rubber Restriction in Rhyme," the parenthetical apology to Walt Whitman.

While the ebullition undoubtedly came from the pen of one who understands the rubber situation, one who is disposed to view all sides of the issue with an open mind and one who is a pleasant, humorous soul altogether—still he really was—Oh, yes, he was—writing and thinking in the vein wherein the blood of Walt Mason flows—not Whitman.

S. H. MOORE, Superintendent, The Hercules Rubber Co., Ltd., Brampton, Canada.

(Certain it is that the author of "Leaves of Grass" never indulged in the type of verse that Walt Mason has made famous. We thank our correspondent for his very friendly and appreciative correction, and freely acknowledge that we thought Mason while writing Whitman. Really, poetry is not our long suit. Prose, often too prosy we fear, is what we turn out with more facility.—The Editor.)

Judicial Decisions

United States vs. Kalter Mercantile Co. et al. (No. 2239). United States Court of Customs Appeals, May 31, 1923. Appeal from Board of United States General Appraisers, G. A. 8542 (T. D. 39157). (Modified.)

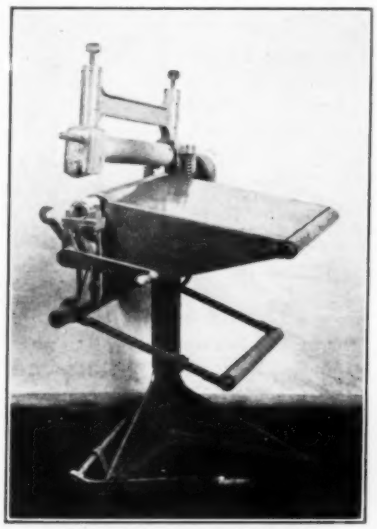
In this case, involving the importation of eight different styles of rubber boots, the decision of the appraiser was questioned, and the case appealed. According to the final decision, boots lined with wool-felt are classified as found by the board under paragraph 368 of the act of 1913, and are dutiable at 10 per cent ad valorem. The decision in regard to the other classes of boots was reversed, such goods coming under the provisions of paragraph 256 of the tariff act of 1913, and dutiable at 30 per cent ad valorem.—*Treasury Decisions*, Volume 43, No. 24, page 35.

New Machines and Appliances

Cord Tire Band Plying Machine

THE work of building a plied endless band of cord fabric for tire building is easily accomplished on the machine here pictured.

A single ply is first passed between the top squeeze rolls, which are hinged for opening vertically, then passed under the lower or swing roll, and ends are united on the table. The squeeze rolls are then closed and adjusted for pressure.



Utility Ply Banding Machine

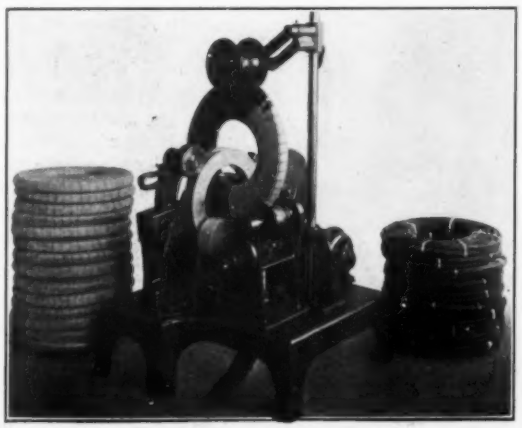
The second ply of fabric is fed slowly into the first one, and as the band passes between the squeeze rolls the plies are united perfectly and without wrinkling. When completed a turn of the crank on the side of the machine releases a latch and opens the rolls, at the same time raising the swing roll to allow the removal of the band. Closing the squeeze roll returns the swing roll to working position.

The operation of the machine is controlled by a foot lever. It can be handled by a girl operator and has a capacity of about 300 bands in eight hours.—Utility Manufacturing Co., Cudahy, Wisconsin.

Machine for Wrapping Hose

The system of wrapping and bundling tires by overlapping spiral strips of paper has been adapted to bundling small hose, as shown by the machine here illustrated.

This machine occupies a floor space 3 feet square and is driven by a 1½ h.p. motor, which is mounted on an elevating platform raised and lowered by a pedal controlled mechanism.



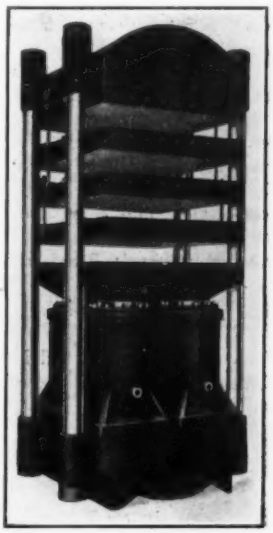
Terkelsen Hose Wrapping Machine

The shuttle is of the solid steel V type tracked between the driving pulley and two idlers mounted on an adjustable yoke. This yoke is hinged at one side and centralizes the wrapped object to the shuttle. The yoke is lowered or raised and clamped in position. The feed rolls on which the object being wrapped rests are revolved by endless chains through worm gear connection from the main shaft. On the vertical extension is mounted a guide roll which is self-explanatory. The shuttle carries a spindle on which is placed the roll of wrapping material.

The actual wrapping time for a bundle of hose is about 7 seconds. —Terkelsen Machine Co., Boston, Massachusetts.

Vulcanizing Press for Matting

Rubber matting in special shapes for floors in limousine and sedan automobiles, passenger elevators, etc., is advantageously vulcanized in the specially designed hydraulic press here pictured.



Adamson Vulcanizing Press

This press weighs about 18 tons. Its four 12-inch rams, operating under 2,000 pounds hydraulic pressure, distribute on the platens over 800 tons pressure, affording extra consolidated construction and joints in the case of tile built matting and the clear impression of molded design where that feature of ornamentation is employed.

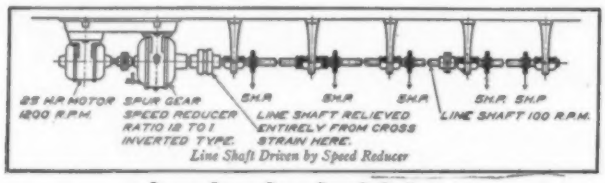
Its practical design, weight and construction have brought this press into favor with makers of rubber matting for every purpose.

The press is equally well adapted for molding heavy slab rubber and objects in large molds, as the press platens measure 48 inches square. Another class of work calling for a heavy press of this sort is vulcanizing hydraulic duck packing to "rock hard" cure in spiral form.—The Adamson Machine Co., Akron, Ohio.

Speed Reducer for Line Shafts

It is no longer necessary to use counter shafts, pulleys and belting for reduction of line shaft speeds to accommodate the varying speed requirements of the different machines being driven. The substitute for the old cumbersome method is the speed reducer, placed between motor and line shaft as shown in the illustration.

The straight line unit construction with shafts coupled to the high speed driving element, or motor, and to the low speed driven element or machine, transmits power by torque. The shafts are subjected to twisting or torsional stress only. Transverse loads causing a bending stress in the shafts are not present. This is a decided advantage and the relief from heavy bending stresses often permits shafts of smaller diameter to be used when coupled up to the speed reducer as here indicated. The reducer drive also gives a better appearance and assures a notable freedom from the possi-



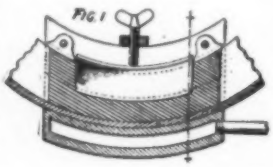
Jones Spur Gear Speed Reducer

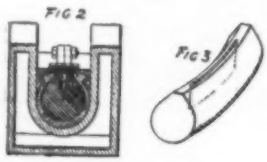
bility of trouble.—W. A. Jones Foundry & Machine Co., 440-51 W. Roosevelt Road, Chicago, Illinois.

Tire Repair Core

This novel device does away with the air or sand bag commonly used in tire repair vulcanizing.

The vulcanizing core is solid rubber and made expansible by a flanged metal wedge which is inserted in a slit on the rim side. Referring to the illustration, Figs. 1 and 2 show cross and longitudinal sections respectively of the steam heated mold, with a tire positioned for a repair and containing the expanded rubber core, which is shown detached in Fig. 3.





Everett Vulcanizing Core

Pressure is applied by the wing screw that expands the core until the shoulders of the wedge engage the bead clamp. Further pressure forces the wedge and bead clamp downwardly and compresses the core into the casing.—Everett Vulcanizing Core Co., Milwaukee, Wisconsin.

Brake Relining Machine

A simple, practical and inexpensive foot power machine for relining brake bands of automobiles is shown in the illustration. The machine is constructed of steel and malleable iron. It is well balanced, flanged, and drilled for fastening to floor or wall. With it a workman quickly and easily performs the operations of punching, countersinking, and riveting necessary for attaching the brake lining.

Thermoid Brake Relining Machine

For the punching, a narrow shanked hardened steel tool is provided. It is securely locked by a bayonet connection in the under side of the tool plunger. For the riveting and countersinking, a rivet set and driving stem are used. The rivet set is placed on the die and anvil base; the driving stem is locked tightly on the under side of the tool plunger.—The Thermoid Rubber Co., Trenton, New Jersey.

Aluminum Mandrels

Aluminum tube mandrels per foot cost two or three times as much as steel tube but nevertheless the advantages are so great that generally the aluminum will be cheaper in the long run. Not only is the deterioration on the steel mandrels much greater but the possibility of damage to the rubber is considerably increased.

Split Rim Tool

A convenient tool and stand for removing rims from tires is represented in the illustration. The stand is constructed of angle iron and is well braced. The tool consists of two fixed hooks and one movable one operated by a hand crank and screw.

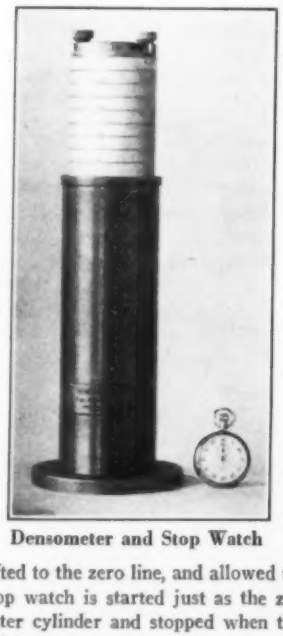
Little Giant Rim Tool

In operation, the forward arm is pivoted so as to swing to the right as the handle is turned. This coils the rim into a smaller perfect circle, instead of merely pushing the end in, thus insuring a perfectly even contraction of the rim on all sides.

The tire is loosened all around and is then easily lifted off. Sprung rims are impossible. The three hooks remain at practically equal distance from each other, regardless of the size of the rim.—Marquette Manufacturing Co., Saint Paul, Minnesota.

Densometer for Testing Porosity

The instrument illustrated, known as a densometer, is used to measure the porosity of rubberized fabrics, balloon cloths, artificial leather, paper, etc.



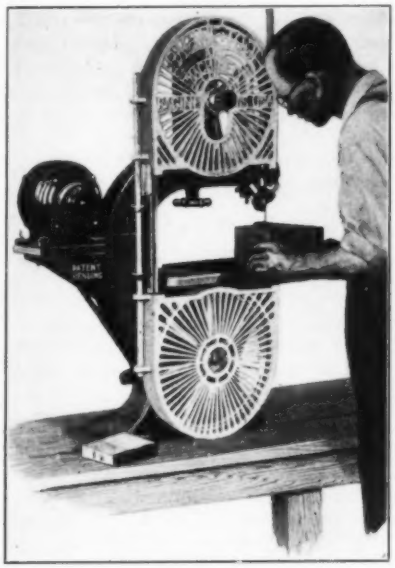
Densometer and Stop Watch

Its determinations are measured in terms of the seconds required for 100 cc. of air to pass through the pores of the test sample under constant pressure. The test orifice has one square inch area. The test is made in about one minute, as follows: The instrument is set on a level surface and its outer cylinder filled with distilled water to a reference mark on the inside. The graduated sliding cylinder is slipped into place, as seen in the illustration. A sample of the material to be tested is placed over the opening at the top of the sliding cylinder and clamped firmly in position by the heavy washer and thumb screws. The sliding cylinder is then lifted to the zero line, and allowed to settle by its own weight. The stop watch is started just as the zero line reaches the edge of the outer cylinder and stopped when the 100 cc. line reaches the same point.

The elapsed time is that required to force 100 cc. of air through the paper and is the control figure sought. The time reading can be taken between any two graduations desired.—W. & L. E. Gurley, Troy, N. Y.

Motor-Driven Band Saw

The compact, motor-driven band saw here illustrated is designed for bench use in cutting wood, metal, or hard rubber.



Duplex Portable Band Saw

It is well adapted for pattern work and shaping stocks in jobs of various kinds in iron, steel, aluminum, brass, vulcanized fiber, hard rubber, etc., cutting either in curves or straight lines as required. Many practical uses can be found for this tool in the factory making hard rubber goods, radio panels, or mechanical rubber goods.

It will be noted that the revolving parts of the machine are well guarded to prevent accident, which is a very desirable feature, as well as the portability of the tool itself.—Racine Tool & Machine Co., Racine, Wisconsin.

Portable Electric Buffing Stand

A most convenient tool in tire repair shops is the flexible shaft electric buffer here pictured.

It can easily be placed near the work and the tool may be started and stopped without shutting off the power, by means of a special clutch.

An added feature is a wire brush permanently attached to the motor for inner tube work.—Albertson & Co., Sioux City, Iowa.

Sioux Flexible Shaft Buffing Tool

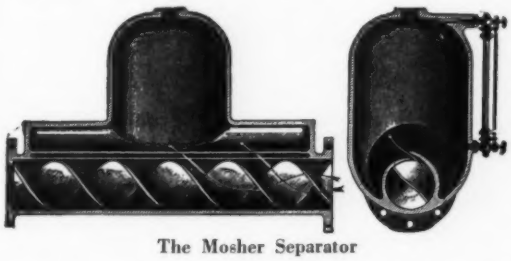
Acco Cable Beads

One of the most effective tire beads for reinforcing and securing the fabric in a straight-side tire is the cable bead known as the Acco. It consists of seven strands of steel wire twisted into an endless cable about ¼-inch diameter, free from welded, soldered or brazed joints. These cable beads are made for all size tires and delivered in hoop-form units ready for use and are very extensively adopted by tire manufacturers generally.—American Chain Co., Bridgeport, Connecticut.

Water and Oil Separator

Steam and compressed air, clean and free of oil and moisture, are very desirable in rubber manufacturing operations. These conditions are easily and effectively secured by the Mosher separator here shown.

The steam, in passing through the separator, is caused to revolve many times around the spiral, and any foreign matter heavier than the steam is thrown outward by centrifugal force. The water, oil, or other matter separated is delivered to the collecting chamber below, where it is isolated from the steam and cannot be again picked up and carried along. The passage of



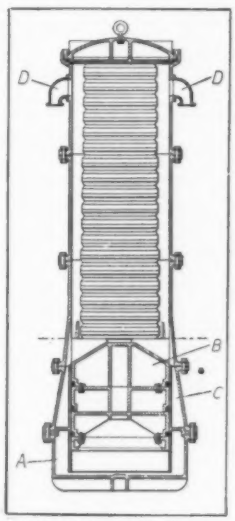
The Mosher Separator

the steam through the separator is free and unobstructed and causes no back pressure.—United Machine & Manufacturing Co., Canton, Ohio.

Machinery Patents

Tire Vulcanizing Press

The construction of this heater eliminates the long ram of the common type and provides a sectional pressure chamber for capacity regulation. Condensation is collected and removed by means of an annular well surrounding the cylinder in which the hydraulic plunger does its work.



Short Coupled Press Vulcanizer

In operation, the pressure chamber being filled with molds, water is admitted to the chamber A and presses upwardly on the plunger B. Steam is then admitted into the pressure chamber, and the molds are heated to effect vulcanization. The condensation flows down into the annular well C. The steam is turned off and the molds cooled by water which rises from the condensation chamber into the heating chamber until let out through outlets DD. The cover being then removed, the plunger raises the molds to the top of the tank, and the operation may then be repeated with the next stack of molds.—Carl E. Rett, Akron, Ohio, United States patent No. 1,456,571.

Other Machinery Patents

The United States

1,453,763 Tire making machine. J. M. Mylroie, assignor to The Goodyear Tire & Rubber Co.—both of Akron, Ohio.

1,453,852 Tubing machine. J. L. Mahoney, New Haven, Conn., assignor to Goodyear's India Rubber Glove Manufacturing Co., a Corporation of Conn.

1,453,889 Tire repair vulcanizer. E. J. Rohne, Minneapolis, Minn.

1,454,058 Marking attachment for strip-forming apparatus. S. C. Lowe, Akron, Ohio, assignor to The B. F. Goodrich Co., New York, N. Y.

1,454,244 Dipping device. F. J. MacDonald, Akron, Ohio, assignor to The B. F. Goodrich Co., New York, N. Y.

1,454,655 Mold for forming repair patches. J. Robertson, Jr., Weehawken, N. J.

1,454,687 Method of making acidproof containers. J. E. Perrault, assignor to Hood Rubber Co.—both of Watertown, Mass.

1,455,207 Bead forming machine. R. W. Hutchens and S. H. Smith, Eau Claire, Wis., assignors to Gillette Rubber Co., a corporation of Maine.

1,455,218 Tire mold. R. M. Merriman, Akron, Ohio.

1,455,240 Hollow article of rubber or like material and process and apparatus for making same. H. Z. Cobb, New York, N. Y., assignor to The Mechanical Rubber Co., a corporation of New Jersey.

1,455,260 Device for applying extensible bands to tire cores. T. Midgley, Springfield, Mass., assignor to Fisk Rubber Co., Chicopee Falls, Mass.
1,456,109 Rubber-tire-forming roller. R. McClenathen, Cuyahoga Falls, Ohio, assignor to Kelly-Springfield Tire Co.
1,456,187 Cast-steel tire mold. J. H. Mulloy, Detroit, Mich., assignor to Morgan & Wright, a Corporation of Michigan.
1,456,211 Apparatus for treating rubber. W. H. Bines, assignor to The Firestone Tire & Rubber Co.—both of Akron, Ohio.
1,456,224 Method and machine for making prepared roofing. A. E. Currier, Millis, Mass., assignor to Baker Rubber Cement Co., Boston, Mass.
1,456,425 Machine for forming pneumatic tires. Barthold De Mattia, Clifton, N. J.
1,456,426 Core and chuck. P. De Mattia and Barthold De Mattia—both of Clifton, N. J.
1,456,571 Vulcanizing press. C. E. Rett, Akron, Ohio.
1,457,290 Apparatus for making rubber rollers. S. E. Schroeder, Oak Park, Ill., assignor to Washington Rubber Co., Cicero, Ill.

The Dominion of Canada

230,451 Tire tool. J. C. McCormick, Everett, Wash.
230,547 Valve operating mechanism. The Goodyear Tire & Rubber Co., assignee of A. G. Maranville—both of Akron, Ohio.

The United Kingdom

194,562 Machine for making tire casings. H. V. Lough, of Morgan & Wright, Jefferson Avenue, Detroit, Mich.
195,308 Tire repair vulcanizer. A. De Gessler, 2 Place de la Navigation, Ouchy, Lausanne, Switzerland.
195,409 Cord tire building machine. Fisk Rubber Co., Chicopee Falls, Mass.

Germany

Design Patents Issued, With Dates of Issue

843,790 (October 19, 1922). Hydraulic kettle press. Hermann Berstorff Maschinenbau—Anstalt g. m. b. H., Hannover.
844,710 (February 12, 1923). Device for insulating electric cables. W. T. Glover & Co., Limited, Manchester, England; represented by: R. Schoneblink and C. Satlow, Berlin, S. W. 61.
844,912 (February 21, 1923). Device for mounting and dismounting a pneumatic tire. Herman Wiedenhaupt, Vorwerk Zetzinbei Wusterwitz, Pommern.
845,534 (April 3, 1923). Heating body for electrically-heated steam vulcanizing apparatus. R. and A. Kriegl, Vienna; represented by: L. Max Wohlgemuth, Berlin, S. W. 61.

Patents Issued with Dates of Issue

376,966 (October 28, 1921). Comb-cutting machine. Firma Fritz Claussner, Nürnberg.
377,261 (July 13, 1920). Tool for mounting tires. Johannis van Steenis, Maassluis, Holland; represented by: Dr. Monasch, Leipzig.

Austria

Patents Published February 15, 1923

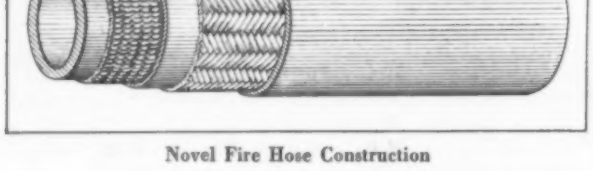
A70-22 Apparatus for making seamless rubber goods by dipping, and with recovery of the solvent. A. Bouler, Malmö, Sweden.
A1296-20 Mold core conveyor. The Dunlop Rubber Co., Limited, London.
A4499-22 Tire valve. K. Prokop, Vienna.
A6489-21 Built-in thermometer for vulcanizing apparatus, particularly for tires. H. Stern, Vienna.

Process Patents

Woven and Braided Hose

A plan of construction designed to provide a hose combining minimum weight with maximum flexibility and strength is shown in the accompanying illustration.

The hose is built of alternate layers of rubber with woven and braided fabrics. The inner and outer surfaces of the hose are



Novel Fire Hose Construction

formed of rubber between which the fabric layers and an intermediate layer of rubber are located.

The inner fabric layer is woven while the outer one is braided. The function of the former is to impart strength, and of the latter, flexibility, chiefly, with added strength. The location of these fabrics may be reversed if desired. The layer of rubber between them acts as a cushion between the fabrics and compensates for expansion and contraction of the hose. The combination of fabrics prevents formation of sharp bends, particularly lengthwise along folded edges, especially when rolled flat or reeled.—Ernest Schulthess, South Orange, New Jersey. United States patent No. 1,455,359.

Other Process Patents

The United States

1,454,074 Pneumatic tube and method of making. W. P. Porter, New York, N. Y.
1,454,939 Method of making articles of varicolored plastic materials. N. H. Michaelsen, Boston, Mass., assignor to Rawson Electrical Instrument Co., Cambridge, Mass.
1,455,364 Method of manufacturing inner tubes. R. E. Stephenson, Indianapolis, Ind., assignor to G. & J. Tire Co., a Corporation of Indiana.
1,455,544 Method of rubber coating articles. L. Minton, Manchester, England.
1,456,357 Valve pad for inner tubes and process of making it. J. A. Bowerman, Wilbraham, Mass., assignor to The Fisk Rubber Co., Chicopee Falls, Mass.
1,456,403 Process of repairing or closing punctures in pneumatic tires and plug for that purpose. W. C. Ranney, Elbridge, N. Y.

The Dominion of Canada

230,549 Construction of an air bag. The Goodyear Tire & Rubber Co., assignee of R. S. Burdette—both of Akron, Ohio.

The United Kingdom

194,530 Method of vulcanizing tires. H. Wade, 111 Hatton Garden, London, England.
195,326 Method of forming rubber-faced blocks. J. B. Hilliard, 123, Douglas street, Glasgow, Scotland.

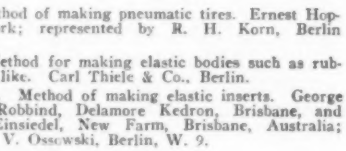
Germany

Patents Issued with Dates of Issue

373,985 (June 24, 1922). Dipping method for making thin-walled rubber hollow goods. Siegfried Waltner, Rankestrasse 5, Berlin, Schöneberg.
375,632 (November 6, 1921). Method of building strips from card layers. Hessische Gummiwarenfabrik Fritz Peter, Klein-Auheim-am-Main.
376,065 (July 10, 1920). Method of making pneumatic tires. Ernest Hopkinson, New York; represented by R. H. Korn, Berlin S. W. 11.
376,367 (June 11, 1922). Method for making elastic bodies such as rubber tires and the like. Carl Thiele & Co., Berlin.
376,990 (November 3, 1921). Method of making elastic inserts. George Arthur Howard, Robbind, Delamore Kedron, Brisbane, and Ferdinand Eric Einsiedel, New Farm, Brisbane, Australia; represented by: C. V. Ossowski, Berlin, W. 9.

SURE GRIP HOSE COUPLINGS

The partial section views here shown illustrate the application of a sure grip air hose coupling, applied respectively to a rubber covered and to an armored hose.



Romort Rubber Covered Hose Coupling

In the first instance the compression bushing or slotted inner sleeve is slipped over the hose. The outer sleeve being screwed into place compresses the inner sleeve and forces the hose against the stem of the coupling, thus forming a permanent air-tight connection.

Romort Armored Hose Coupling

When armored hose is used the inner sleeve is not required as the outer sleeve threads onto the armor coils and holds the hose secure. The threads are left hand, making possible a tight and permanent connection with the armor.—The Zinke Co., Chicago, Illinois.

Fabric Testing and Index Values

Features of the Mullen Machine—Advantages of Bursting Test—Index Value Defined—Tire Fabric Tests

By C. J. Burkley

AT THIS time when there is so much interest in the quality of rubber fabrics, it may be timely to point out certain new and useful applications of a testing device used by the paper trade for determining the bursting strength of paper and allied products. This machine may be used to advantage in testing a wide variety of sheet materials, including textiles. It tests a circular area of material by the application of hydraulic pressure against a rubber diaphragm in contact with the test specimen, and the "ultimate" or bursting strength is the hydraulic pressure required to rupture the material. This pressure is measured in pounds per square inch upon a standard registering pressure gage of the Bourdon tube type. Test samples of a definite shape are not necessary; the design of the clamping jaws insures a constant sample size. Furthermore, a number of tests can be quickly made upon a comparatively small sample of material.

One advantage of the bursting test is that the strength of the material can be expressed in terms of unit strength by dividing the bursting pressure in pounds per square inch by the weight of a unit area of the material being tested. The logic of this is appreciated when it is considered that in the bursting test it is the thickness of material being tested which resists burst. Obviously the weight of a unit area is a measure of this thickness, as a thin piece of material would weigh less per unit area than a thicker one, other things being equal.

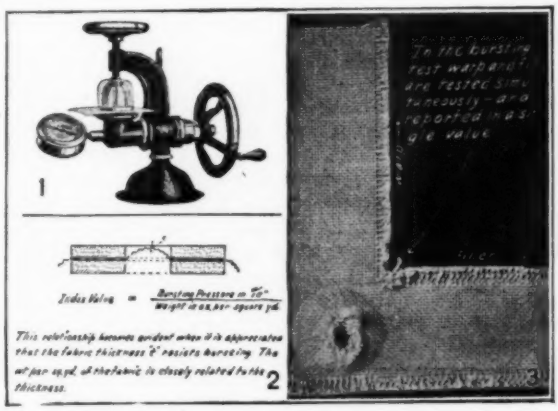


Fig. 1. The Mullen Tester. Fig. 2. Cross-Section of Area Subject to Test. Fig. 3. Bursting Test of 17¼ oz. Fabric

The reason why the weight of a unit area is chosen instead of the gage or thickness is because it would be impractical to measure the gage of certain materials satisfactorily; for example, fabrics. Another reason is because the price of many materials is very often based upon weight, and therefore, where strength is of importance, a comparison can be made in terms of strength per dollar, other things being equal.

The value obtained by dividing the bursting strength of a material by the weight of a unit area is called the index value of the material, and may be expressed by the general formula:

$$\text{Index Value} = \frac{\text{Strength}}{\text{Unit Weight}}$$

Of course in all such tests the bursting pressure used should be the average bursting strength of a number of tests. The weight is commonly expressed in ounces per square yard, obtained by dieing out a small sample of definite area, weighing it, and expressing the results in ounces per square yard.

The index value constitutes a unit strength value and justifies itself not only because tensile strength comparisons of other materials are generally made and reported in terms of unit strengths, but also upon its practical utility. Without going into detail regarding index values, it may be timely to point out an interesting application of the Mullen tester and index value in testing certain classes of fabrics.

Tensile strength in fabrics has been a matter of considerable controversy, and considered of importance only where fabric is used for mechanical purposes. Probably one reason why strength has not been featured more is due to the method of testing and expressing results, and the difficulty of interpreting them. It is common to test the warp and filler separately, without relation to their cooperation and other vital properties. Fabric is a team composed of warp and filler functioning as a unit in most cases. Therefore, the best test is probably one which will report the strength of the fabric in a single value. In the bursting test, the strength is reported in a single value involving warp, filler and their cooperation. Furthermore, it is possible to express this strength in terms of unit strength by means of the index value.

The following experimental index values were made on some 17¼ ounce, 23 by 23 count, 11 by 11 ply tire fabrics made in the same style and construction but from the various grades of cotton.

Grade of cotton	Number of tests	Index value
Combed Sea Island.	5	45.0
Combed Egyptian ..	3	40.0
Carded Egyptian ..	10	38.1
Carded Peruvian ...	3	36.5
Carded Peeler	2	33.6
Carded American ..	7	27.6

An interesting point in the above tests made at 4 per cent moisture content is that combed Egyptian has a higher unit strength value than the carded, and the combed is considered of better quality. Another point is the fact that in the same style and construction with different grades of cotton there is progressively more unit strength from the American Upland up through to Sea Island.

The writer has pointed out that strength of fabric is more seriously considered when it is used for mechanical goods in which the fabric is required to have a certain total strength. There is a nice distinction between total strength and unit strength or index value of a fabric. The index value points to quality and when there is better quality there is higher unit strength, other things being equal. The significance of the index value as applied to certain fabrics is shown in testing materials in general to ascertain a certain property, when it is often necessary to measure another property which accompanies the one desired. For example: the terms "high and low test" applied to gasoline refer to the Baumé value of the liquid gasoline, which is some function of the specific gravity, and it is a well-known fact that the better gasolines have a higher Baumé test than the lower grades. Because this high test invariably occurs with high grade gasoline, and also because the test is easily made, the trade recognizes that a 70-degree gasoline is superior to a 62-degree material. In like manner a fabric made of Sea Island cotton is superior to one made of Egyptian or American, and it has already been shown

that Sea Island has a higher index value in the same construction.

In general the index value reacts in pointing out inferior textiles by lowered strength, increased weight, or both, producing a lowered value. Inferior textiles are those fabrics not made of the lower grades of cotton and sold as such, but fabrics made with a strong warp and weak filling of poor quality, filled and sized to give the appearance of quality. Other examples are fabrics subjected to harmful chemical treatment. If the foregoing fabrics were tested, their index values would all show a lower index value than the kind of material they were meant to represent.

The Editor's Book Table

Book Reviews

"A SYMBOL OF SAFETY." BY HARRY CHASE BREARLEY. Doubleday, Page & Co., New York, 1923. Cloth, 290 pages, 6x9 inches, indexed and illustrated.

THIS book is an interpretative study of a notable institution organized for the purpose of safeguarding lives and property against loss by hazards of every kind, especially fire.

W. H. Merrill, president of the Underwriters' Laboratories, in his introduction reviews the development of the organization and the scope of its work.

The purpose of the laboratories has never been commercial, and its personnel has endeavored always with self-effacing devotion to perform tasks the effect of which on public welfare are now seen to be incalculable.

Numerous chapters explain the significance of the Underwriters label, and how the many technical problems are handled. Concerning rubber goods, there are sections on factory inspection of cotton rubber-lined fire hose; testing the qualities of rubber insulation; testing physical qualities of rubber; and the study of chemical problems, such as the deterioration of rubber used in fire hose, wire insulation, etc.

The Appendix is quite as important as the body of the book and contains much valuable data, including specifications, tests and forms.

"NETHERLANDS EAST INDIES AND BRITISH MALAYA." BY John A. Fowler. Trade Commissioner. Government Printing Office, Washington, D. C., 1923. Cloth 411 pages, 5¼ by 9 inches, 2 maps, illustrated.

This work, published by the Department of Commerce, Bureau of Foreign and Domestic Commerce, is known as Special Agents Series No. 218. The book is in effect a commercial geography of the countries treated, covering their physical features and resources, also their import and export trade.

The rubber plantation industry is summarized in a section of 21 pages, covering cultivation, acreage, plantation, organization, grades, exportation, auction sales, prices, market review and brief list of publications on rubber.

"FACTS AFFECTING THE IMPORTATION OF RUBBER PRODUCTS into British West Indies." Separate monograph prepared by the Rubber Division, Department of Commerce, P. L. Palmerton, chief. Published by Bureau of Foreign and Domestic Commerce, Washington, D. C. Paper, 8 by 9 inches.

One of the interesting features of this monograph is its report concerning the rapid development in these islands of our rubber goods export trade. In 1913 the rubber manufactures exported to the British West Indies by the United States aggregated in value $77,958, while in 1919 such exports had risen to $810,036, a growth of 939 per cent. Exports in 1922, valued at $409,422, represent a growth of 425 per cent over the 1913 level. Practically all rubber goods used in the British West Indies are imported from the United States, Canada, and the United Kingdom, in the order named. During the calendar year 1921, 74 per cent of the rubber tires imported by Trinidad and Tobago alone came from the United States, 16 per cent from Canada, and 8 per cent from the United Kingdom. It should be noted, however, that 80 per cent of the rubber goods imported into Barbados comes from the United Kingdom, and the balance from Canada (a country accorded tariff preference) and the United States.

"THE PRESERVATION AND SHIPMENT OF LATEX." PUBLISHED by The Rubber Growers' Association, Inc., 2-4 Idol Lane, London, E. C. 3. Paper, 6 by 9½ inches.

A booklet of information of value to rubber dealers, estate agents and managers, the following subjects being treated: Preservatives; Ammonia; Containers; Basis for Assessment of the Value of Latex; Latex versus Crêpe or Sheet Rubber—Comparative Costs; Some Uses of Latex.

"YEAR-BOOK OF THE DEPARTMENT OF AGRICULTURE, CEYLON, 1923." Issued under the authority of the Director of Agriculture, Peradeniya, Colombo. Published by H. W. Cave & Co., Colombo, Ceylon. Paper, 7 by 10 inches.

In the section of this report devoted to the cultivation of rubber particular mention is made regarding Ceylon's experiments in connection with the budding of rubber, the first successful results being secured in 1921 at the Experiment Station, Peradeniya. Many estates in the island now have a fair number of budded plants. Individual yields of selected trees are also being recorded, and particular attention is being given to problems connected with the preservation of latex and also to the prevention of various Hevea diseases.

"TWENTY-THIRD YEAR BOOK—1923." PUBLISHED BY THE Rubber Association of America, Inc., New York, N. Y. Prepared by the general manager and secretary. Paper, 54 pages, 6 by 9 inches.

Included in the first section of this well-known publication are the organization personnel, the membership roll of the association and the constituency of various committees and divisions. The second section contains the charter, constitution and by-laws, lists of officers and directors, and a necrology. Some new features, including the mention of new divisions, appear in this latest issue.

"BIBLIOGRAPHY OF COLLOID CHEMISTRY." BY HARRY N. Holmes. Preliminary edition. Issued in mimeograph form by the National Research Council, Washington, D. C., 1923. Paper, 8½ by 10½ inches, 138 pages.

This bibliography contains 1800 references and is stated by the author to be only moderately comprehensive. It is offered as a basis for criticism by other colloid makers preliminary to later formal publication. It includes only the early months of 1922 and covers the full scope of colloid chemistry applications.

"FACTS AFFECTING THE IMPORTATION OF RUBBER PRODUCTS into Philippine Islands." Separate monograph prepared by the Rubber Division, Department of Commerce, P. L. Palmerton, chief. Published by Bureau of Foreign and Domestic Commerce, Washington, D. C., Paper, 8 by 9 inches.

The Philippine Islands constitute a leading market for our rubber goods, as the following items indicate: 98 per cent of all rubber goods imported into the Philippines originate in the United States; in 1921 practically all tires imported (over 99 per cent) were of United States manufacture; while about 99 per cent of the rubber footwear imported represents our production. In 1922 the Philippine purchase, at $462,501, of our canvas shoes with rubber soles surpassed that of other countries, while only the Mexican and Cuban markets outstripped that of the Philippines in the buying of American-made rubber soles and heels. In thus supplying the Philippines with rubber goods, the United States has been greatly aided by tariff preference, and because of this the Japanese, although in close proximity, are unable to extensively compete.

Recent Articles Relating to Rubber

Plantation Rubber. A paper on the history and development of the plantation rubber industry, remarks on restriction, etc., read before the Institution of Rubber Industry.—P. J. Burgess. *The India-Rubber Journal.* May 19, 1923, 11.

New Destructive Uses for Rubber. Concerning wasteful uses for rubber, which after serving an important function is thrown away. Upon such lines the form of rubber known as Ozonite, expanded rubber, embodies many important features and is finding new and important applications.—Charles L. Marshall. *Bulletin of the Rubber Growers' Association.* May, 1923, 244-246.

Latex Papers from the Point of View of Printing. Rubber latex paper has no detrimental effects on the printing properties of paper whatsoever. Its drying properties are not governed by the latex in the paper but by the combination of size and latex. These constituents can be graded to suit the work for which the paper is required in exactly the way as size by itself is added in making paper without latex.—Anonymous. *Bulletin of the Rubber Growers' Association.* May, 1923, 246-247.

Rubber Coagulated with Sodium Silicofluoride, Hydrofluosilicic Acid, Its Salts and Bifluorides. The mold preventing qualities of sodium silicofluoride may be of special importance in eliminating the effect of mold on the rate of vulcanization. Hydrofluosilicic acid, lead, magnesium, and zinc silicofluorides, and sodium, ammonium and potassium hydrogen fluorides can also be used as coagulants.—H. P. Stevens. *Bulletin of the Rubber Growers' Association,* 1923, 5, 170-172.

Vulcanizing Properties of Rubber from Preserved Latex. Rubber obtained by acetic acid coagulation of latex which had been preserved with ammonia or with a mixture of sodium hydroxide and a coal tar product, such as "Arboretas" or "Agrisol," showed a rate of vulcanization approximately equal to the normal for crêpe rubber. There was no evidence of any deleterious action of the preservative on the rubber. When soaked in water, rubber prepared by the desiccation of latex spray lost its soluble constituents which had been retained from the serum; the extracted rubber vulcanized much less rapidly and gave a weaker product.—H. P. Stevens. *Bulletin of the Rubber Growers' Association,* 1923, 5, 168-170.

The Bayer Vulcanization Accelerators, "Vulkacits." The Bayer accelerators include aldehyde-ammonia (Vulkacit A), piperidine piperidyldithiocarbamate (more correctly piperidine piperidyldithioformate; Vulkacit P), diphenylguanidine (Vulkacit D), hexamethylenetetramine (Vulkacit H), and thiocarbanilide. The proportion used (calculated on the rubber) should be 1 per cent for the three first-named, while 1½ per cent and 2 to 4 per cent should be used respectively for the last two. Zinc oxide has a strong activating effect on all these accelerators, with the exception of diphenylguanidine. For thiocarbanilide the proportion of zinc oxide may be usefully ranged from a minimum of 3 to 4 times the weight of the accelerator up to 50 per cent or even more calculated on the rubber. When using such accelerators a reduced proportion of sulphur to rubber is desirable; with the piperidine compound and zinc oxide the proportion of sulphur should be between 1 per cent and 2 per cent.—Kautschuk-Prüfungs-Laboratorium Farbenfabriken vormals F. Bayer & Co., *Gummi Zeitung,* 1923, 37, 440-442.

The Vulcanization of Rubber. Cantor Lecture III. The Royal Society of Arts.—H. P. Stevens. *The Rubber Age,* London, June, 1923, 194-203.

Mechanical Problems in the Rubber Industry. Continuation of a paper before the Institution of Mechanical Engineers, February 16, 1923. Discusses solvent recovery from spreaders, calendering, tubing machines, and vulcanization plant.—H. C. Young. *The Rubber Age,* London, June, 1923, 208-211.

The Alkaline Earth Sulphates, Their Use in Rubber Manufacture. Treats of gypsum, barytes and celestine.—H. L. Terry. *The Rubber Age,* London, June, 1923, 211-213.

The Use of Rubber Products as Dielectrics—I

A consideration of some of the most important fundamental characteristics of dielectrics.—W. S. Flight, A. M. I. E. E. *The India Rubber Journal,* June 9, 1923, 13-15 Graphs.

Methods of Tinting Latex. G. S. Whitby, *The Rubber Age,* London, May, 1923, 134.

Accelerated Aging of Vulcanized Rubber. (Italian) Method and results.—B. Marzetti, *Giorale di Chimica Industriale ed Applicata,* March, 1923.

The Amount of Acid in Latex Coagulation.—Dr. O. de Vries. *The India Rubber Journal,* May 5, 1923, 31-33.

On Tearability of Vulcanized Rubber. Method and results.—B. Marzetti, *The India Rubber Journal,* April 28, 1923, 9-10.

The Value of Rubber Pigments. Historical survey. Discussion of factors affecting pigment value; namely, refractive index, specific gravity, thermal factors, color, particle shape and size. Individual pigments, blacks, zinc oxide, lithopone, lead pigments, antimony sulphide pigments, arsenic sulphide, whiting. Discussion of the paper.—D. F. Twiss, *The India Rubber Journal,* April 14, 1923, 21, 28.

Rubber. A discussion of the properties of rubber from the colloidal standpoint.—H. P. Stevens, British Association for the Advancement of Science. Fourth Report, 1922, 357-380.

On the Vulcanization Accelerator, Vulkacite. Chemical composition of various Vulkacite accelerators. Vulkacite P is piperidyldithio-carbonic acid piperidin; Vulkacite A is aldehyde ammonia; Vulkacite D is diphenylguanadin; Vulkacite H is hexamethyl tetramine; Thiocarbanilid Bayer is diphenylthiourea.—*Gummi Zeitung,* April 13, 1923.

Thermal Changes During Vulcanization. A method for determining the intensity of the energy changes during vulcanization and calculation of their approximate amount.—Ira Williams and D. J. Beaver, *Industrial and Engineering Chemistry,* March, 1923.

New Trade Publications

A SMALL LOOSE-LEAF BOOKLET, ATTRACTIVELY BOUND IN LEATHER, has been recently sent to the editor of THE INDIA RUBBER WORLD by R. T. Vanderbilt Co., Inc., 50 East Forty-second street, New York, N. Y. The first three sections of the booklet are devoted to data concerning rubber and compounding ingredients, vulcanization and rubber goods, and various fabrics, especially those used in tire manufacture. The fourth section contains some important charts and tables, while extra pages, designed for memoranda, represent another useful feature.

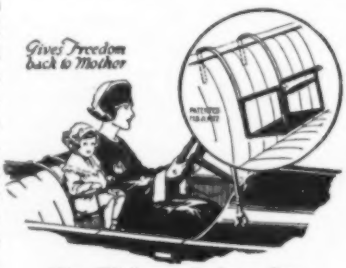
SOME VERY PRACTICAL AND USEFUL INFORMATION IS BEING FURnished in two booklets recently published by The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania. The "Manual for Dictators" contains important hints regarding sentence and paragraph construction, as well as a list of words and phrases frequently misused, while the "Manual for Stenographers and Dictaphone Operators" supplies other no less valuable data.

DURING THE FIRST FOUR MONTHS OF 1923 ARGENTINA HAS REmained a leading purchaser of our canvas shoes with rubber soles, the values for such goods being as follows: January, $98,915; February, $19,062; March, $131,963; and April, $88,969. In this particular market Argentina during January and March easily outstripped all other nations.

New Goods and Specialties

Auto Seat for the Small Child

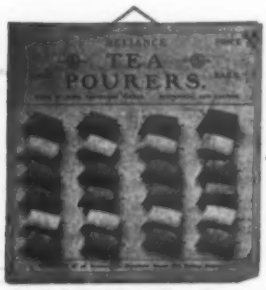
THE dealer in automobile accessories will be interested in the automobile seat for the small child illustrated. It is very simple and sturdy in construction. The seat and hand holds are of polished wood, while the frame is of steel, covered with rubber tubing where it comes in contact with the upholstery of the car. It simply hooks over the back of the automobile seat, the weight of the child tending to hold it in place.—The "Holemtite" Auto Seat Co., Chattanooga, Tennessee.



The "Holemtite" Auto Seat

Rubber Tea Pourer

A small item carded in such a way as to be prominently displayed is being offered to the English trade. It is a rubber tea pourer, with a lip which fits down into the spout of any teapot in such a way as to take care of the drip. The display cards arrange them in one and two dozen lots.—Reliance Rubber Co., Limited, London, E. C. 4, England.



Carded Rubber Tea Pourers

Rubberized Float for Swimming

Very readily adjusted is the float shown in the illustration. It is designed to make swimming easy for the beginner and is made of fabric rubberized on both sides, with inflatable sections at the sides, each section being equipped with its own valve. When these sections are inflated the strap is slipped over the head and the ends of the inflated sections are held out until the wearer gets into the water. An upward backward kick lifts the body to horizontal position where it lies flat on the float, which the inventor declares will buoy up a 300-pound weight.—A. K. Zawadzki, 48 Hanson Place, Brooklyn, N. Y.

Hawaiian Swimming Float

THE ANIMATE TOY CO., 31 EAST 17TH STREET, NEW YORK, N. Y., has added to its line of crawling bugs a set of handsome moths, including the Robin, Regal, and Silk Moths. The antennæ are of rubber.

A Rubber Heel That Corrects Posture

By making the inside half of this sole of hard rubber, only 25 per cent resilient, and the outer half of soft rubber, 75 per cent resilient, the manufacturer claims that arch and ankle weaknesses are prevented or corrected and the poise of the wearer improved. The inner or arch side of the foot is held up and the weight is carried on the outer or bonal structure, thus compelling perfect balance and insuring walking comfort. The arch-guide heel, as it is called, is used on both orthopedic and regular footwear and is made in men's, women's and children's sizes.—Pietzuch's Wonder Arch-Guide Rubber Heel Co., Cincinnati, Ohio.

The Arch-Guide Heel

Breaker-Proof Bathing Cap

The Bush breaker-proof bathing cap illustrated is designed to stay in place in the roughest water or during the most boisterous sport of the wearer. Two elastic bands fit snugly around the head, one along the line of the hair and the other along a line from just above the eyes to just below the ears. A loose fold of material is left between the bands over the ears to prevent any pressure upon them, and also to avoid strain on the bands. The body of the cap is the usual thin rubber bag shape.—The Atlantic and Pacific Rubber Co., Fresno, California.

The Bush Cap

Elastic Bands of Bush Cap

Rubberized Spare Tire Cover

The rubberized fabric employed in this tire cover is not too heavy to fit well, but it is tough and strong enough to protect the spare tire from all kinds of weather, whether biting frost or blistering sun. Its appearance is such as to make the spare tire harmonize with the entire car, and it is bound to appeal to the entire motor car field as being just right in make and material.—L. C. Chase & Co., Boston, Massachusetts.

Chase Treadside Tire Cover

Proving the Balance of a Golf Ball

The manufacturers of the "Burke 30" golf ball are circulating a pamphlet showing the ball at rest on the surface of a pool of mercury in a bowl, and calling attention to the well-known fact that any object which floats will turn, when dropped upon mercury, until its center of gravity is nearest the mercury. The "Burke 30," the circular states, when dropped on the mercury remains at rest, thus proving its perfect balance.—The Burke Golf Co., Newark, Ohio.

Pneumatic Rubber Ring for Commodes

Especially adapted for children's use is the rubber ring shown here which fits over the top of the commode or may be used over the regular toilet seat. It is made of soft white all-rubber stock and is very smooth, flexible and heavily reinforced. A straight flap extends down into the bowl just far enough to hold the ring in place and prevent slipping. Each ring is put up in a separate box container. The outside diameter is 8½ inches.—Hodgman Rubber Co., 25 West 43rd street, New York, N. Y.

Hodgman Commode Ring

Rubber Additions to the Kiddie Kar

The Kiddie Pedal Kar

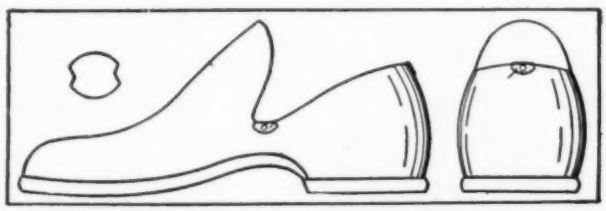
The well-known Kiddie Kar is growing up. Instead of the youngsters propelling it with their feet on the ground they may now speed along by means of corrugated rubber pedals. Rubber grips are also provided on the handlebars of the new design and the wheels are equipped with first quality regulation pneumatic tires.—H. C. White Co., North Bennington, Vermont.

Sponge Rubber Beach Ball

A new play ball, known as the "Peppy Play Ball" is being marketed by the Tyer Rubber Co., Andover, Massachusetts, especially for the beach trade. It is made of red sponge rubber, has a lively bounce, and can be used with a bat, if desired, without damage either to the ball or to passersby. It floats, and it cannot be deflated by puncture, therefore it has been found enjoyable as a toy for the pet dog as well as for folks. The No. 1 size is 1⅞ inches in diameter and weighs 1¾ ounces. The No. 2 size is 2½ inches in diameter and weighs 4 ounces.

Reinforcement for Rubber Overshoes

A recent invention which reduces the strain on rubber overshoes at the points where tearing is most likely to occur, consists of small, shaped pieces of rubber which the inventor refers to as elastic hinges. The overshoe is slit from the edge, and an enlarged perforation is made so as to distribute the strain over a much larger area and greater number of threads of the overshoe than is usual. Then an elastic patch is folded over the edge and fastened down, covering the slit and the hole. In the illustration the hinge is shown applied to the side of the overshoe and the heel. The shape of the patch is seen at the left of the drawing.—George L. Zucker, Inventor, East Orange, New Jersey.



The Zucker Hinge Applied at Side and Heel

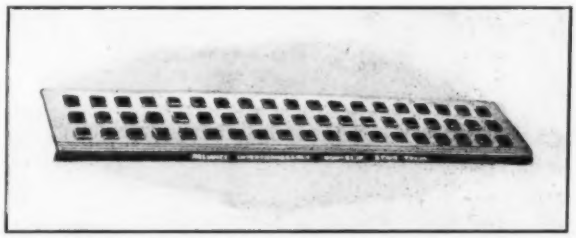
Next Winter's Style in Gaiters

Profiting by last season's experience, dealers in rubber footwear are making ample provision for the prophesied demand for women's gaiters. The Pavlovo, which The B. F. Goodrich Rubber Co. found so profitable last season, is still featured, but an improved fastening, resembling somewhat the fastening on very modern tobacco pouches, makes this company's new boot, called the "Mystic," a favorite in the race for popularity. The fastening consists of two metal strips through which a patented clasp is drawn, completely closing the boot with a single movement or leaving it open as far as may be desired, should the "flapper" taste survive. The top of the boot is of Jersey cloth, made of pure Australian wool.—The B. F. Goodrich Rubber Co., Akron, Ohio.

The Goodrich "Mystic" Boot

Rubber-Studded Stair Treads

To overcome the objection made to ordinary stair treads of rubber matting, that they wear too readily in the center or on the outer edge, a repairable rubber-studded stair tread has been devised. It is a cast aluminum plate with numerous mortises in which are fitted square, interchangeable studs of tough molded rubber. It is claimed that not only are the treads easy to clean because of the lateral arrangement of the studs, but that they are silent, non-slipping, durable, non-corrosive, and that whenever wear is excessive on the outer edge or in the center such sections may be made practically new by interchanging the much worn studs with others but little worn. The transference is effected by simply unscrewing the tread, pushing the studs through to the back, and inserting them anew into the mortises. The standard treads are 30 by 5½ inches, ⅛-inch thick, with 57 rubber studs ⅞-inch square in three rows, the studs projecting 3/16-inch above the metal.—Reliance Rubber Co., London, England.



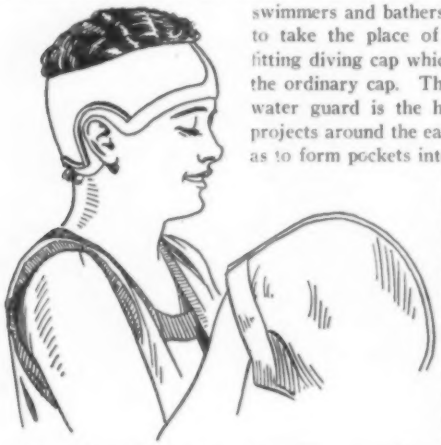
Reliance Stair Treads with Interchangeable Studs

Improvement to Remington Typewriter Roller

The latest improvement to the Remington typewriter is a cushioning of the roller which results in a deadening of the sound. The outside cover of the roller is approximately the same as has been used by the manufacturers for a long while, but in addition there is a soft rubber layer between this covering and the wooden platen. This produces the cushioning effect, though the manufacturers claim that their No. 12 has 14 noise reducing features.—Remington Typewriter Co., New York, N. Y.

A Rubber Substitute for the Tight-Pressing Diving Cap

The Submarine Water Guard shown in the illustration is among the most practical of the season's contributions to the comfort of swimmers and bathers. It is designed to take the place of the very tight-fitting diving cap which is worn under the ordinary cap. The feature of this water guard is the heavy rim which projects around the ears in such a way as to form pockets into which the ears fit, thus relieving them from pressure, at the same time fitting into the hollows behind the ears and at the back of the neck so that when a cap just tight enough to press against the rib is worn over it the inventor declares there is no possibility of water getting to the hair or ears. The device is made in one piece of heavy pure gum rubber, with the rib molded into it, not cemented on, so that it cannot rip off.—Lew-Mar Products Co., 39 East 27th street, New York, N. Y.



Submarine Water Guard for Wear under Bathing Cap

The New Fisk Tire for Heavy Cars

The illustration shows the new Fisk Flat-Tread Cord tire, especially designed for heavy cars requiring extra quality. The manufacturers claim that this tire was tested by more than a million miles of service before it was offered to the trade and that the sales record it is making is phenomenal.—The Fisk Tire Co., Inc., Chicopee Falls, Massachusetts.

Fisk Flat-Tread Cord

Rubber Bracelets

Among the many accessories to the up-to-date bathing beach costume is the rubber bracelet, which may be had in colors to match the suit. It is made of three or more loops of thin rubber tubing, with a cluster of rubber flowers connecting them.—I. B. Kleinert Rubber Co., New York, N. Y.

Sponge Rubber Arch Supports

A sponge rubber substitute for the rigid metal arch support is now on the market, which is so flexible that it can be bent double and which conforms to the contour of the foot in every position. It is made of Russian sponge rubber, an air-light composition, and specially prepared leather which is guaranteed not to grow hard or crack. The sponge rubber cushion cannot loosen or slip and is said to become more and more resilient with wear. The alternate compression and relaxation of the sponge sets up a circulation of air and absorbs acidic perspiration while gently massaging the muscles and ligaments.—Thompson-Barlow Co., Inc., 43 West 16th street, New York, N. Y.

"Airflex" Sponge Rubber Arch Support

Money-Saving Bag for Packing Rubber

Rubber dealers and planters will be interested in the canvas bag illustrated, which is used for packing rubber and saves, it is said, about $1.40 on each package, since the cost of packing each bag is only about 9 cents or less, whereas the cost of packing wooden boxes is $1.50. The bag was patented in the Straits Settlements and Federated Malay States and is used throughout British Malaya and the Dutch Indies. The ordinary ready-made size is 19 by 19 by 24 inches and holds 200 pounds of sheet rubber, protecting it from damage of every kind, including heat and moisture. It can be used from 90 to 100 times, the manufacturers say, and besides reducing the cost of packing it saves "waste freight" charges, for it can be folded into a small parcel when empty.—Arisaka Canvas Bag Manufacturing Co., Limited, 96 Robinson Road, Singapore.

The Arisaka Canvas Bag for Rubber

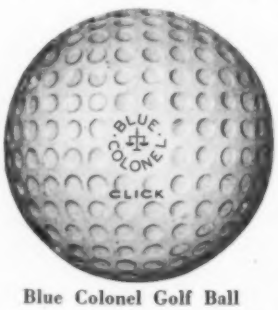
New Slush Pump Packing

In oil well drilling much time is lost in frequent replacement of balata-fabric valves in slush pumps, and much damage is often done to valve seats on account of the valves holding sand and grit and grinding such abrasives into the valve seats. With a new valve packing known as "Whalite" and made of a novel compound (said to be neither fabric nor balata) formed under 3,000 pounds hydraulic pressure in unique molds that allow no overflow, the old trouble is said to be quite overcome. "Whalite" valves, it is claimed, promptly eject the granular material drawn in by the pump and not only save valve seats but are cheaper than ordinary pump packing and last about three times as long as the latter.—West American Rubber Co., 400-432 N. avenue 19, Los Angeles, Calif.

"Whalite" Pump Packing

Perfectly Balanced Golf Ball

In a rigid test with a mechanical putter, in which putts from two to six feet were recorded, the Blue Colonel golf ball shown in the illustration is said to have proved its perfect balance by rolling straight for the cup each time without a variation of a hair's breadth. Another of the selling points to which the manufacturers call attention is the firm, solid "click" which golfers know indicates a hard-wound ball that rises quickly, carries far, and will not cut. The designs are dimpled or meshed.—St. Mungo Manufacturing Co. of America, 121-123 Sylvan avenue, Newark, New Jersey.



Blue Colonel Golf Ball

The Manufacture of Rubber Erasers

A New Jersey Eraser Pioneer—Manufacturing Processes—Washing, Compounding, Sheeting, Cutting, Molding, Curing and Finishing—Various Types of Erasers

By Weldon Roberts[1]

Of the numerous means of utilizing rubber today, its use in erasers is of particular interest, since erasers, or more strictly the erasive qualities of rubber, are said to have given rubber its name. When rubber first became known to the English-speaking world, these frictional qualities suggested rub, or rubbing, and it was but a simple transition to the formation of a noun with this Gaelic word as a root.

Christopher Roberts

Incidentally the term "India," which was formerly almost always used in connection with rubber and is still largely so used in England, was for a long period a misnomer, for until comparatively recently the great bulk of the supply of rubber came to us from South America. Of late years the geographical facts of rubber production have arranged themselves more in accord with terminology so that we might now speak of India rubber with more accuracy.

One of the pioneer makers of rubber erasers, Christopher Roberts, who may be said to have contributed largely to the present predominance of America in the industry, started in the early fifties in a New England town, removing shortly afterward and establishing his factory in Newark, New Jersey. Because of the fine quality of the products of this early leader he was asked by one of his customers to enter into an agreement whereby he would sell to that one concern only, the goods to bear their name. As the arrangement continued to be mutually advantageous all his life, his name as manufacturer did not appear.

Due to his efforts and to the efforts of others it resulted that America became the home of the finest quality of rubber erasers and, with the industry largely concentrated in Newark, New Jersey, that city became the eraser center of the World. Millions of erasers of differing textures and styles adapted to the finely graded requirements of modern consumers are yearly sent out, going to eliminate the errors that may occur in the accounts of the Finnish merchant, to rub out tracing marks for the draftsman on the banks of the Thames, to repair the slips of the almond-eyed Mandarin, and to straighten out mistakes made in a hundred languages. It seems that the eraser business might almost be called an industry founded on error; but it may be more happily described as one which furnishes a means for the elimination of error.

[1] President, Weldon Roberts Rubber Co., Newark, N. J.

Crude Rubber Preparation

The primary processes—washing, drying, and refining crude rubber, are the same in the manufacture of rubber erasers as in making other rubber goods. The Pará rubber biscuits are cut into small pieces and put through washer rolls while a copious shower bath of water runs over them. In this way the bark and dirt common to the South American product are washed out and the clean rubber is sheeted into a flat mass that has been described as resembling a large order of tripe. The washed rubber is hung up and dried on racks or enclosed in a blower or vacuum system until all moisture has been removed. It is then refined through large heated rolls so that the proper pigments and minerals may be added. The operation is much the same if Ceylon rubber is used instead of the Pará rubber, though as the Ceylon rubber is cleaner and drier, the refining process is somewhat simplified.

Compounding and Milling

When this stage is reached, we come to one of the essential features of eraser manufacture, as of all other rubber processes; namely, the formulæ used for mixing other ingredients with the refined rubber. In passing it may be said that pure rubber alone would not make a good eraser. The formulæ are based on knowledge of chemical reactions and, which is even more important, on careful data which has been gradually compiled as a result of seventy years' experience in making erasers. A careful, accurate formula, in accordance with which a uniformly fine quality of chemicals and pigments is added to the refined rubber, is the *sine qua non* of a good eraser.

While variations are necessary to meet different requirements, it may be generally stated that eraser formulæ are so made up that the compound will endow the finished eraser with a certain frictional quality combined with a friability which will clean paper with the least possible abrasion of surface. The idea is to have the eraser crumble away rather than the paper. The eraser crumbs that rub off absorb pencil marks efficiently when the compounding formula has been chosen with wisdom and care.

Inspection and Packing Room

Sheeting and Cutting the Stock

After the various compounds have been mixed with the pure rubber in accordance with the formula, the mass on the rubber mills is run out into smooth sheets. The sheeting to the required thickness may be done by the rollers on which the mixing has been accomplished, by calenders, or by a cutting or slicing machine which cuts off long, flat sheets of the proper thickness from a pressed, solid block of compounded rubber. It is only necessary that the stock be sheeted to the thickness required for the particular eraser. At this point most eraser stocks look alike,—that is, in the form of large, flat sheets of red, white, gray or green compounded material,—but after this different styles of erasers require different treatment. It is therefore advisable for us merely to follow one or two typical kinds of erasers through the later stages of manufacture.

Molding and Vulcanizing

As an example we may take an article such as the green pencil knob eraser which is made to fit on the end of any pencil. The green sheeted stock, about 3/16-inch thick, is roughly chopped into strips of a width convenient for use in a tubing machine. The strips are fed into the back end of this machine, forced through a cylinder by a screw, and squirted out at the front in the form of cords. These cords are cut into pieces about an inch long, ready for use in a mold which contains a number of impressions of the pencil knob. The small pieces are pressed into the mold in steam plate presses, and under this pressure and heat the reaction known as vulcanization takes place and the knob is shaped. After the proper time has elapsed the presses are released, the molds opened, and the cured pencil knobs removed. Because of the necessity of the vulcanizing process, through which 99 per cent of all manufactured rubber goods must pass, sulphur is as essential to rubber manufacture as rubber itself.

Some erasers are not molded to form but are cut the required size and shape. Others, such as the combination ink-pencil erasers, circular erasers for typists, and erasers for draftsmen and accountants, require the joining together of sheets of different kinds of stock before the molding, cutting, or punching process gives the eraser a rough approximation to its final finished shape and appearance. One difference in the several methods of finally shaping the eraser lies in the fact that in molded goods vulcanization takes place at the same time that form is given to the article, while in other processes the erasers are roughly shaped before vulcanization, which then takes place in an open vulçanizer.

The Finishing Process

With the compounded rubber cut, molded, or punched into the proper oblong, square, biased or circular shapes, and with vulcanization complete, the article is in an unfinished though recognizable form. The finishing operations must then be performed and in many instances one of the first things required is that the erasers be tumbled together until the edges are smoothed and rounded. There is usually a long line of massive tumbling barrels rolling on horizontal axes, into which the erasers are placed and in which they tumble about, rubbing against each other and against the sides of the barrels until a smooth, finished appearance results. When cleaned or washed, printed and packed, they are ready for sale.

Varied Types and Special Styles of Erasers

The ordinary user scarcely realizes the varied demand for erasers. For instance, to the draftsman several different styles of eraser are necessary tools. He needs a special soft pliable rubber, a special surface cleaning eraser, special ink erasers for paper and for tracing cloth, as well as different styles for use in his erasing machine. The needs of the artist are similar, though in his case shading or blending rubbers and dough eraser, an unvulcanized absorbent rubber, would be added. The typist, as a rule, clings to one of the several circular styles having a sheathing of soft red rubber and a thin center or core of more gritty stock. Similarly, office, commercial, and school erasers include a variety of shapes and consistencies.

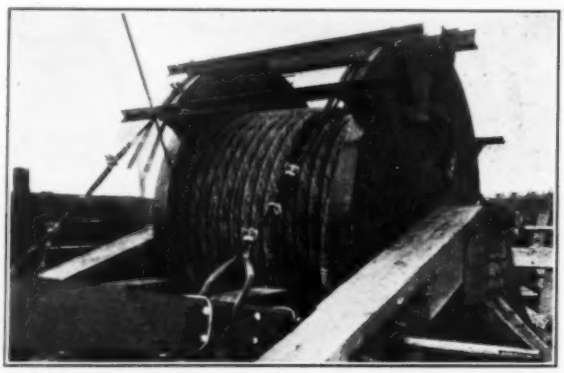
There are special erasers for shoe manufacturers, finishing rubbers for electrotypers, and one which erases rust, tarnish, and stains from metals, which is used by the manufacturer of sheet metals, by the golfer, the mechanic, and the housewife.

This finely discriminated line of erasers has been slowly developed to meet the special needs of modern consumers. The styles of today are thus the result of a continuous progress dating from seventy years ago, at a time when erasing was mostly done with bread crumbs.

Brake for Laying Submarine Cables

In laying submarine cables certain precautions must be taken, and particular attention given to the braking system used. In a recent installation The Northwestern Electric Co., Portland, Oregon, found that in order to have efficient and satisfactory service large brake surfaces were necessary.

The accompanying illustration shows a cable reel with specially designed brake mounted on a barge which was planned and built by the engineers of this company for laying a three-conductor, 250,000-circ. mil, 13,200-volt armored submarine cable across the Columbia River at Vancouver, Wash. A standard cable reel was equipped with strap-iron rims and cast-iron bearings and mounted on steel shafting. A double-rim brake was constructed similar to the automobile type. Oak brake blocks were used with a total braking surface of 20,088 square inches. Lever rams 2 inches by 8 inches were used of sufficient weight and leverage



Cable Reel Brake for Laying Submarine Cables

when acting on the brake to stop and hold the cable with no additional external force. These safety levers are in turn operated with a reverse lever arm easily handled by one man.

With the large area of braking surface used it was possible to grease the surfaces so that the cable could be run out at a constant speed, with jerking eliminated. All that is required to stop the cable is for the operator to let go of the reverse lever, and the weight of the lever arms combined with the greased braking surface brings the cable to a smooth, sliding stop. At no time does the braking surface become even appreciably warm.

The brake on each rim was designed to take care of the entire load in case of failure on either rim. By unbolting the large U-bolts shown in the picture the entire braking frame can be swung back, permitting the reel of cable to be placed in or taken out of the frame at will.—E. F. Pearson in *Electrical World*.

News of the American Rubber Trade

Financial

New York Stock Exchange Quotations

June 26, 1923

	High	Low	Last
Ajax Rubber com.	7⅞	7⅝	7⅞
Fisk Rubber com.	9⅛	8¼	8¾
Goodrich, B. F., com.	26	25½	25½
Goodyear pfd.	45¾	45½	45½
Goodyear prior pfd., 8.	95¾	95	95
Kelly-Springfield com.	35	33⅛	33⅝
Lee Rubber & Tire com.	20⅞	19¼	19½
United States Rubber com.	44½	42⅛	42½
United States Rubber 1st pfd., 8.	97⅜	97	97

Akron Rubber Stock Quotations

Quotations of June 22, supplied by App-Hillman Co., Akron, Ohio., were as follows:

	Last Sale	Bid	Asked
American com.	7¾	...	10
American pfd.	50	...	50
Amazon com.	2	...	3½
Firestone com.	70	70	71
Firestone 6% pfd.	98	97½	98
Firestone 7% pfd.	90	90⅛	91
General com.	170	...	168
General 7% pfd.	100	...	100
Goodrich 6½'s	100⅜	100	100½
Goodyear com.	12	11⅞	12½
Goodyear 7% pfd.	47	46	48
Goodyear 1st mtg. 8's	117	116½	117¼
Goodyear deb. 8's	103½	103¼	103¾
India com.	96½	...	96
India 7% pfd.	90	95	90
Mason com.	3½	2½	3½
Mason 7% pfd.	27	25	30
Marathon	2¾	...	2
Miller com.	70	70½	75
Miller pfd.	102½	100	101¾
Mohawk com.	16	...	11¾
Mohawk 7% pfd.	65	...	59½
Rubber Products	20	18	23
Seiberling com.	6⅞	6¼	6¾
Seiberling 8% pfd.	65	...	60
Star com.	20	20	39
Star 8% pfd.	80	...	80

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Boston Woven Hose & Rubber Co...	Pfd.	$3.00	June 15	June 1
Boston Woven Hose & Rubber Co..	Com.	$1.00	June 15	June 1
Brunswick-Balke-Collender Co.....	Pfd.	$1.00	June 15	June 1
Firestone-Apsley Rubber Co.....	Pfd.	1¾% q.	July 1	June 20
General Tire & Rubber Co.....	Pfd.	1¾% q.	July 2	.....
B. F. Goodrich Co.....	Pfd.	3½% s.a.	July 1	June 27
Goodyear T. & R., Canada.....	Pfd.	3½%	July 3	June 20
Goodyear T. & R., Canada..... Pr.	Pfd.	1½%	July 3	June 20
Goodyear Tire & Rubber Co.....	Pfd.	$2.00 q.	July 2	June 15
Hood Rubber Co.....	Com.	$1.00 q.	June 30	June 20
India Tire & Rubber Co.....	Com.	1%	.....	June 20
India Tire & Rubber Co.....	Pfd.	1¾%	.....	June 20
Kelly-Springfield Tire Co.....6%	Pfd.	$1.50 q.	July 2	June 15
Overman Cushion Tire Co., Inc....	Pfd.	7%	July 10	June 30

Financial Notes

The Fisk Rubber Co., Fisk Building, New York, reports net sales for the quarter ending March 31 as approximately $14,470,000, and net profits after depreciation, interest and other surplus charges, as $1,050,000, compared with the same period last year, when the figures were: net sales, $10,154,253, and net profits, $354,969. The company is producing tires at the rate of 23,000 daily at the Fisk and Federal divisions, yet their 128 branches report shortage of tires to meet their sales requirements.

The Ajax Rubber Co., Inc., 218-222 West 57th street, New York, reports sales in dollar volume for the first quarter of 1923 to be more than 100 per cent greater than for the same period last year and the unit sales as approximating the same increase. Production was also far in excess of last year's corresponding period, but in order to effect the increase in sales the inventory of finished goods on hand was reduced.

For the first quarter of the year earnings of the Seiberling Tire & Rubber Co., Akron, Ohio, were at a rate of $69.53 a year on the preferred stock, and $3.08 per share on the common. The company is said to have paid all accumulated dividends to April 1, 1922, and should be in a position to pay the balance by January 1, 1923.

New Incorporations

Amalgamated Rubber Co., The, May 21 (Ohio), $10,000. A. L., E. C. and E. L. Abt; B. Van Horne; M. H. Skelton. Principal office, 30 High street, Akron, Ohio. To manufacture rubber goods.

Auto Tire Sales & Service Co., Inc., April 23 (Illinois), $10,000. C. L. Risburg, 102 Euclid avenue; E. Schimpff, 2306 Western avenue; R. D. Fearn, 207 Frink street; W. Lawrence, 703 Wayne street, all of Peoria, Illinois. Principal office, 407 Franklin street, Peoria, Illinois. To deal in tires and accessories.

California Golf Ball Co., May 18 (California), $200,000. P. J. Higgins; E. C. Huyck; G. A. King. Principal office, Los Angeles, California. To manufacture golf balls.

Carlsten Tire & Rubber Co., June 15 (Delaware), $550,000. M. E. Scanlon; M. F. Vance; E. E. Craig, all of Dover, Delaware. Delaware agent, United States Corporation Company, Dover, Delaware. To manufacture and deal in rubber, rubber tires, tubes and other rubber goods.

Daugherty Rubber Co., May 28 (Ohio), $25,000. E. J. and C. O. Daugherty; J. E. Gallagher; E. J. and J. L. Dowling. Principal office, Cleveland, Ohio. To manufacture tires.

Dawson & McCarthy Co., The, May 2 (Ohio), 1,000 shares no par value. J. A. Schlitz; L. C. Hinslea; F. M. Kafelle; M. Glenn; G. M. Lavelle. Principal office, 7411 Detroit avenue, Cleveland, Ohio. To manufacture rubber goods.

Detachable Heel Co., May 25 (Massachusetts), $200,000. W. A. Maloney, 200 Watertown street, Newton; M. E. Maloney, Moore Building, Plymouth; H. F. McCarthy, 30 Stuart street, Watertown, all of Massachusetts. Principal office, Newton, Massachusetts. To manufacture and deal in detachable and interchangeable rubber heels.

Eastern Motor Supply Co., Inc., June 18 (New York), $10,000. E. Waldman, 1155 East 12th street, Brooklyn, New York; I. R. Levy, 249 West 112th street, New York City. To manufacture tires.

Elastic Products Co., The, May 10 (Ohio), $10,000. H. E. and R. R. Wolff; E. J. Anthony; M. L. Stewart; L. Fernbach. Principal office, Cincinnati, Ohio. To manufacture rubber goods.

Great Lakes Rubber Products Co., The, May 25 (Ohio), $1,000. E. F. and S. L. Wohlwerth; F. J. Hoban; H. H. Green; R. A. Bernstein. Principal office, Prospect Building, Cleveland, Ohio. To manufacture rubber products and compounds for the rubber trade.

Harvey Rubber & Supply Co., The, May 4 (Ohio), 250 shares no par value. H. G. Heiss; J. H. Smart; C. B. Ford; E. Brown; M. M. Rankin. Principal office, Cleveland, Ohio. To deal in tires and tubes.

Keystone Rubber Ball Manufacturing Co., June 7 (Delaware), $10,000. C. B. Outten; S. L. Mackey; L. C. Christy, all of Wilmington, Delaware. Delaware agent, Corporation Service Company, Equitable Building, Wilmington, Delaware. To manufacture and deal in rubber balls and similar articles made of rubber.

Magnum Rubber Products Corporation, June 5 (Delaware), $1,000,000. T. L. Croteau; M. A. Bruce; A. M. Hooven, all of Wilmington, Delaware. Delaware agent, Corporation Trust Company of America, DuPont Building, Wilmington, Delaware. To deal in tires, tubes, mechanical rubber goods, etc.

Matthews-Burleson Tire Co., April 1 (Texas), $25,000. J. L. Matthews, president; M. D. Wagner, vice-president; E. M. Burleson, secretary and treasurer. Principal office, Corner Main avenue and Travis street, San Antonio, Texas. To distribute tires and tubes.

Meeley Tire & Rubber Co., May 23 (New Jersey), $1,000,000. F. R. Hansell; E. H. Loman; J. A. MacPeak. Principal office, 417 Market street, Camden, New Jersey. To manufacture, buy, sell, export, import, trade and deal in tires, rubber and rubber goods and fabrics.

Mol-Aer-Vin Tire Co., May 31 (Delaware), 10,000 shares without nominal or par value. C. B. Outten; S. L. Mackey; L. C. Christy, all of Wilmington, Delaware. Delaware agent, Corporation Service Co., 901 Market street, Wilmington, Delaware. To manufacture and deal in tires, tubes, casings and other articles consisting of rubber, or other articles used in connection with the manufacture of automobiles, airplanes, and other vehicles.

Mutual Batteries Utilities Co., Inc., June 7 (Delaware), $1,750,000. D. Grill, 329 Halsey street; H. C. Barney, 5 Hayward street; L. Goodman, 43 163rd street; W. C. King, 615 Flatbush avenue; G. H. L. Schroeder, 1195 Liberty avenue, all of New York City. Delaware agent, Registrar and Transfer Company, 100 West 10th street, Wilmington, Delaware. To manufacture and sell storage batteries.

North Eastern Rubber Co., June 7 (New Jersey), $125,000. G. Degenring, president; A. O. Murray, secretary and treasurer. Principal office, 280 North Broad street, Elizabeth, New Jersey. To manufacture the Eckrode Extensor Rubber Endless Flap for clincher rims.

Pacific Rubber Co., March 10 (Washington), $500,000. F. F. Moore, Spokane; J. W. Collins; M. Katon, both of Los Angeles, all of Washington. Principal office, Seattle, Washington. To manufacture rubber products.

Pneumatic Appliances Corporation, March 31 (New Jersey), $100,000.

E. H. Harding; A. G. Ellison; A. M. Campbell. Principal office, 390 George street, New Brunswick, New Jersey. To manufacture rubber products.

Power City Tire & Battery Co., April 9 (South Dakota), $25,000. E. R. Year; E. E. Liedtke; O. T. Anderson. Principal office, Sioux Falls, South Dakota. To deal in tires and batteries.

Reliance Tire Co., May 20 (Ohio), $25,000. C. M. Britz; A. Sander; H. A. Lange; H. O. Hohnhorst; G. Kaufman. Principal office, 1026 Gest street, Cincinnati, Ohio. To deal in tires.

Republic Rubber Co., The, May 23 (Ohio), 50,000 shares no par value. J. T. Harrington; J. P. Huxley; C. F. Smith; T. L. Jackson; D. J. Lyman. Principal office, Youngstown, Ohio. To manufacture rubber goods of all kinds.

Rochester Tire Corporation, June 15 (New York), $5,000. M. J. Mungovan; F. A. Miller; A. F. Aman. Principal office, Rochester, N. Y. To deal in auto tires.

Sanford Rubber Works, Inc., June 4 (Connecticut), $50,000. J. R. and S. M. Sanford; S. A. Doughty. Principal office, Salisbury, Connecticut. To manufacture soles, heels, molded rubber goods.

Silica Rubber Co., May 1 (Ohio), $50,000. C. W. McLaughlin, president; M. Dettelbach, vice-president; E. R. Kelly, secretary; Dr. L. E. Sisler, treasurer; H. L. Kinsley, general manager. Principal office, Akron, Ohio. To manufacture battery containers from Kin-Sil-Ite for automobiles, radio and railway storage batteries.

Spartan Rubber Products Co., May 9 (Ohio), $50,000. J. H. Moriss; R. A. Egar; H. C. Orkins; J. R. Davis; G. L. Elden. Principal office, Cleveland, Ohio. To manufacture rubber goods.

Stetson Pneumatic Heel Corporation, May 18 (Delaware), $1,000,000. M. M. Lucey; M. B. Reese; L. C. Browne, all of Wilmington, Delaware. Delaware agent, Colonial Charter Company, 927 Market street, Wilmington, Delaware. To manufacture and deal in any articles or thing made of wood, rubber, celluloid, etc.

Triplok Rim Co., May 1 (Pennsylvania), $10,000. M. Brooke; P. C. Palmer; J. R. Richards. Principal office, Philadelphia, Pennsylvania. To manufacture and deal in automobile rims, and accessories.

Trump Rubber Co., The, May 26 (Ohio), $200,000. R. M. and E. H. Trump; F. H. Alderfer; W. Bacon. Principal office, 1857 East Market street, Akron, Ohio. To manufacture rubber goods.

United Baltic Corporation, June 8 (New York), 200 shares no par value. J. F. Dempsey; F. N. Bangs; F. W. Jackson, all of 55 Wall street, New York City. To manufacture rubber products.

Virginian Tire & Rubber Co., May 15th (West Virginia) $100,000. G. C. Hendrick, president; F. R. Talbott, first vice-president; R. W. Lauer, second vice-president; A. A. Lilly, secretary; B. F. Worrell, sales manager. Principal office, St. Albans, West Virginia. To manufacture tires and tubes.

Walton Airless Tire Co., March 9 (California), $1,000,000. J. S. and G. O. Walton; E. E. Nichols; J. A. Judkins; W. A. Kampmann; G. B. Stephens; G. W. Welch. Principal office, Los Angeles, California. To deal in tires.

Wisconsin-McWade Rubber Co., April 21 (Wisconsin), $10,000. A. C. Siegl, president, 4732 Woodlawn avenue; M. M. Rieck, vice-president, 688 Downer avenue; A. A. Rieck, secretary and treasurer, 688 Downer avenue, all of Milwaukee, Wisconsin. Principal office, Milwaukee, Wisconsin.

The Rubber Trade in the East and South

Manufactured Goods

Activity in practically all divisions of rubber manufacturing is now reduced to the usual summer seasonal proportions. Recent periods of severe heat caused a marked decrease in manufacturing for the time being.

In automobile topping there is still plenty of old business but no new orders are being placed. The production of insulated wire is proceeding in large volume. Automobile tire output production has been severely cut but is expected to hold fairly well at the reduced rate for July and August.

Footwear factories are operating at normal schedule on rubber shoes and winter goods. The season for tennis is practically closed. Heels are very competitive. There is a huge production of low quality heels at very low prices. Mechanicals are somewhat irregular, some factories reporting good business and others considerable decrease. The railroads are not purchasing rubber goods in as heavy volume as in the preceding few months.

Attorney for the United States Rubber Co.

Kennedy M. Thompson, attorney for the United States Rubber Co., New York, N. Y., was born in Brooklyn, New York, February 15, 1881. His early education was obtained in the public schools of Brooklyn and at Mercersburg Academy, Mercersburg, Pennsylvania, which latter he left before graduation to enter business in 1898 as an office boy for the United States Rubber Co.

Continuing in the employ of this company as a bookkeeper, he attended night sessions of the New York Law School from 1907 to 1909 and the following year was admitted to the Bar of the State of New York. In 1912 he became a member of the legal department of the United States Rubber Co., and is now attorney for the company. He possesses in rare degree both the intimate trade and legal knowledge necessary for his present work.

Mr. Thompson is a member of the General Tax Committee of The Rubber Association of America, the Lotus Club and the West Side Tennis Club.

Hodgman—Paramount Consolidation

The Hodgman Rubber Co., 25 West 43d street, New York, has acquired a substantial interest in the Paramount Rubber Consolidated, Inc., Little Falls, New Jersey.

The result of this consolidation will be the sale and distribution of the well-known Paramount products, such as balls, toys and allied lines, through the Hodgman company, and the transfer at an early date of the manufacture of these products to the Hodgman factory at Tuckahoe, New York, under the same management as is now operating the plant at Little Falls.

With the increased manufacturing facilities that will be available under the new arrangement, it will be possible to meet satisfactorily the largely growing demand for the well-known Paramount products.

Gunn Resigns as U. S. Tire President

At the regular monthly meeting on June 7 of the directors of the United States Rubber Co., 1790 Broadway, New York, N. Y., the resignation of J. Newton Gunn, both as vice president of the United States Rubber Co. and president of the United States Tire Co., was announced and accepted. C. B. Seger, president of the United States Rubber Co., will, according to an authorized statement, assume direct charge of all activities of the tire division of the company and will be elected president of the United States Tire Co.

C. J. Butler and G. S. Shugart, both second vice presidents of the United States Rubber Co., will have charge respectively of the manufacturing and sales activities of the tire division.

New York

The Wishnick Tumpeer Chemical Co. has established a New York office at 130 West 42nd street, with warehouse facilities at the Bush Terminal, Brooklyn. Henry H. Stiller is in charge.

Habich & Hammesfahr, Inc., crude rubber brokers, have removed from 24 Stone street to rooms 601-605 at Exchange place, New York, N. Y.

The I. B. Kleinert Rubber Co., manufacturer of rubber specialties, is now in new headquarters at 485 Fifth avenue, corner of 41st street, New York, N. Y. V. Guinzburg is president.

The Dominion Asbestos & Rubber Corporation, 1780 Broadway, New York, N. Y., has recently formed The Darcoid Co., Inc., which is to take over the manufacture and distribution of the packings, mechanical rubber goods, and miscellaneous asbestos and rubber products of the Dominion company. Officials of the Darcoid company include William M. Meek, president and treasurer; William F. McClean, vice president; and M. Rueger, secretary. Mr. Meek is president of the Dominion Asbestos & Rubber Corporation.

The Star Rubber Co., Akron, Ohio, has recently appointed H. K. Simmons as its Eastern district manager, in charge of the New York City branch, while Thomas B. Johnson has also become associated with this branch organization. Mr. Simmons was for many years connected with The Miller Rubber Co., while Mr. Johnson was associated with the Diamond Rubber Co.

Press reports state that the Achilles Rubber & Tire Co., Binghamton, New York, has recently become insolvent. Liabilities are placed at $330,600, and assets at $260,000. George J. H. Crowe is mentioned as referee for the creditors.

The following changes in executive personnel have been recently made by the Kelly-Springfield Tire Co., 250 West 57th street, New York, N. Y.: John V. Mowe, formerly vice president, director and sales manager, has resigned, while Maurice Switzer, vice president, continues the supervision of sales and advertising. W. H. Bell and T. S. Lindsey become sales managers, the former in charge of branches and organization, and the latter assuming control of branch and manufacturers' sales. H. R. Hurd, formerly assistant advertising manager, becomes advertising manager, with E. E. Hill as assistant.

The Hewitt Rubber Co., Buffalo, New York, has leased an additional floor in the building occupied by its New York City branch, at 9 West 61st street.

The Beacon Tire Co., Beacon, New York, has been placed in the hands of David B. Costuma, as receiver. Included in the action for receivership is the Automobile Tire Co., distributer for the first-mentioned organization, and owner of a majority of the stock of the manufacturing concern. The aggregate liabilities are listed at $128,367, and the assets are estimated at about $400,000.

The Palmyra Packing Co. has been incorporated under the laws of the state of New York, with capital of $100,000 and general offices and factory at Palmyra, to manufacture a complete line of asbestos, flax, rubber, and duck packing. The officers of the company are: John N. Todd, president; Frank W. Coats, vice president; Samuel H. Hunt, treasurer; and Charles McLouth, secretary.

Connecticut

The Sanford Rubber Works, Inc., Salisbury, Connecticut, has taken over the Sanford Rubber Works, and is now planning the construction of a factory addition, to cost approximately $10,000. The company, with a capital stock of $50,000, was incorporated June 4, 1923, by J. R. Sanford, S. M. Sanford, and S. A. Doughty. Soles and heels are the company's specialty, these being manufactured under the trade names of "FlexTex" and "LaTexTex."

Pennsylvania

J. F. Williams, eastern representative of H. H. Robertson Co., Pittsburgh, Pennsylvania, recently removed his offices from New York City to 1306 Real Estate Trust Building, Philadelphia. The Robertson organization includes R M R mineral rubber among its products.

The Continental Rubber Works, Erie, Pennsylvania, manufacturer of "Vitalic" tires and other rubber goods, is building a four-story and basement addition to be used for enlarging the tire department as well as providing additional room for the mechanical molded goods department. Officials of the company include: Theron R. Palmer, president and general manager; Alexander Jarecki, vice president; Albert E. Caldwell, secretary; Charles S. Coleman, treasurer; and Herman M. Reinecke, assistant treasurer.

Southern Notes

The Stark Mills, a subsidiary of the International Cotton Mills, Hogansville, Georgia, will erect a new plant adjoining the present property at Hogansville, to manufacture tire fabric and other products formerly made at the Stark Mills at Manchester, New Hampshire. About 20,000 spindles are being transferred to the southern plant and new machinery will be purchased. The new mill will be of concrete construction, with about 250,000 square feet of floor space.

A. H. Johnson and R. C. Faulkner represent, at Dallas, Texas, recent additions to the branch forces of the Star Rubber Co., Akron, Ohio.

The Fisk Rubber Co., Chicopee Falls, Massachusetts, has recently opened a branch office at Huntington, West Virginia. C. M. Peterson was appointed branch manager.

The Rubber Trade in New Jersey

Manufactured Goods

Business continues good at the Trenton rubber manfacturing establishments, with the exception of one or two places. The Bergougnan Rubber Co. has been compelled to cut down production because of a decline in orders. The company had been operating with three shifts for some time and even went to some expense to install additional machinery. The Spartan Rubber Co. continues to operate with three shifts and is unable to keep up with orders with the present equipment. The concern intends in the fall to double the size of the present plant.

The Murray Rubber Co. announces that business is very good in the tire, tube and mechanical departments. The company does not look forward to any business depression. The Ajax Rubber Co., Inc., reports production as being normal with good business booked for the month of July. The United & Globe Rubber Corporation continues busy in all departments. The curtailment of production at some of the large Akron plants has had no effect in Trenton. In fact, the late season has benefited the Trenton manufacturers.

Murray Rubber Co. Elects Officers

At a meeting of the directors of the Murray Rubber Co. the following officers were elected: C. Edward Murray, Jr., president and general manager; William H. Peck, treasurer; H. E. Berrien, assistant treasurer; H. R. Nason, secretary; N. S. Conover, assistant secretary; A. N. Alexander, comptroller; R. H. Paddock, director of tire sales; R. M. Stuart, director of mechanical sales; and W. W. Sanders, factory manager. The following comprise the board of directors: C. Edward Murray, Jr., William H. Peck, H. J. Angermeier, W. D. Campbell, William M. Pepper, and J. Cornell Murray. The company is operating to capacity, three 8-hour shifts being employed each day. Sales to May 1 amounted to $3,498,713, which is about 100 per cent increase over the same period last year.

Magnum Corporation Buys Smith Plant

The plant of the Smith Rubber & Tire Co., Garfield, New Jersey, which failed last fall has been sold to the Magnum Rubber Products Corporation of Delaware. The consideration was about $12,000, according to a deed filed in the office of the county clerk in Bergen County.

The plant was originally sold to Robert J. Metzler, of Morris Plains, and Barthold De Mattia, of Clifton, by the trustee in bankruptcy. The two latter filed a chattel mortgage in which they appear as mortgagees, and John Baxter and Herbert C. Stoddart, of Wellington, New Zealand, as the mortgagors. The chattel mortgage is for $103,000 and covers all goods, including machinery, fixtures, and tools. Baxter and Stoddart deeded the property to the Magnum Rubber Products Corporation.

Dural Plant in Profitable Operation

Frederic M. Pearse, receiver of the Dural Rubber Co., Flemington, announces that the concern is being operated at a profit and has plenty of business. He was named receiver some time ago when the corporation, because of too much overhead expense, was unable to meet its obligations. Edgar H. Wilson, formerly president and office manager, is no longer connected with the concern. W. C. Ehrenfeld, a practical rubber man, has been placed in charge of the office to look after both manufacture and sales.

New Combination Plant to Be at Trenton

The Combination Rubber Manufacturing Co., Bloomfield, will move its plant to Trenton in the near future. Although the company has been located at Bloomfield for the past twelve years it is essentially a Trenton enterprise as it is controlled by the Hamilton Rubber Manufacturing Co., and is financed by Trenton capital. The company plans to erect an entirely new plant in East

Trenton, four stories high and 275 by 77 feet, of brick reinforced with steel. The products will include tires, tubes, and mechanical rubber goods. About 500 hands will be engaged.

The officers of the Combination Rubber Manufacturing Co. are: Horace T. Cook, president; Henry N. Young, vice president; Frank W. Servis, secretary; Fred L. Conover, treasurer; Arthur Colvin, superintendent. These officers, together with George R. Cook and A. Boyd Cornell, of the Hamilton Rubber Manufacturing Co., make up the board of directors.

The New Jersey Rubber Industry

The Michelin Tire Co., Milltown, has prepared a report showing the importance of New Jersey in the tire and automotive industries. Figures obtained from the Department of Commerce show that New Jersey ranks third among the states in the manufacture of rubber tires and tubes, being preceded only by Ohio and Massachusetts. Tires valued at $30,000,000 were produced in 1921, which was considered a poor year. On the first of the year there were registered in New Jersey 341,626 cars and trucks. In percentage of gain in automobile registration New Jersey stood fourth among all the states during the year 1922. There were 68,000 more automobiles and trucks at the end of the year than at the beginning.

Trenton

William C. McMahon, vice president and general manager of the Ajax Rubber Co., Inc., has returned after an extended trip through the Detroit motor vehicle manufacuring district and reports that the motor concerns are very busy. Mr. McMahon made a study of conditions while in the Mid-West and reports that conditions warrant a busy season for his concern. The Ajax company's production of tires and tubes is purchased principally by Michigan automobile concerns.

The Hamilton Rubber Manufacturing Co. has erected a rest room for employes at the plant in East Trenton.

The United & Globe Rubber Corporation, Trenton, New Jersey, which a few months ago took over the assets of the former United & Globe Rubber Co., recently appointed an executive committee composed of J. Philip Bird, chairman; W. M. Hager and Foster M. Voorhees. At a meeting held June 6 the creditors of the company, while expressing their confidence in the management of the above-mentioned executive committee, also appointed a committee of their own, consisting of Ex-Governor E. C. Stokes, Arthur H. Wood, H. J. Haigh, W. M. Haff, and Robert Badenhop. The two committees will cooperate in carrying on the affairs of the company, while production at the plant is to be continued, and business maintained as formerly.

Articles of incorporation have been filed by Jemison Brothers, Inc., to acquire the automobile tire and accessory business now conducted by Harry S. Jemison and Albert F. Jemison, 104 East Hanover street, Trenton.

The Mercer Tire Co., of 25 West State street, Trenton, has filed papers of dissolution with the Secretary of State at Trenton. Vice Chancellor Malcolm G. Buchanan, of Trenton, was registered agent for the company. Frank W. Thropp, John E. Thropp, Henry Dech and the late Peter D. Thropp, manufacturers of tire making machinery, were stockholders of the company.

New Jersey

The Meeley Tire & Rubber Co., Garfield, New Jersey, has purchased the factory of the Armstrong Rubber Co., at Garfield. The new company will make 30 by 3½ tires exclusively, beginning operations July 1 on a special brand of 30 by 3½ cord and fabric tires. G. G. Meeley is president and P. S. Wighton is vice president and factory manager.

The Lambertville Rubber Co., Lambertville, New Jersey, is unable to secure additional help through lack of dwellings. C. E. Murray, acting superintendent, has appealed to the town authorities for relief so that the company will not be compelled to build an additional plant elsewhere. He said that the sales force was reorganized to such a point of efficiency that in three months a 500 per cent business increase was obtained. The production force now numbers 600 hands and should be doubled, for which fifty new dwelling houses would be needed.

The E. J. McCormick Rubber Co., Inc., Lodi, New Jersey, was recently incorporated at Trenton, with $25,000 capital to take over the business now carried on at Lodi under the name of the E. J. McCormick Rubber Co., which is a division of the Cigol-Behrens Rubber Manufacturing Co. The McCormick company will manufacture dental vulcanites, rubber dam, and dental rubber of all kinds. The incorporators are William Bal, Newark; James J. Govey, Hackensack; and Albert H. Robinson, Passaic.

The Spartan Rubber Co., Yardville, near Trenton, has been incorporated in Texas with $5,000 capital for the purpose of marketing the company's products in the southwest. The principal office of the company will be located at Fort Worth, Texas.

The New Jersey Chemical & Rubber Co., Newark, suffered $75,000 damage from fire recently, a portion of the plant and some machinery being destroyed. The plant was shut down during June but will be rebuilt and production will begin about September 1.

The Rubber Trade in Massachusetts

Manufactured Goods

Rubber boot and shoe production is at capacity on fall and winter goods. All factories are booked months ahead and the labor supply is still inadequate. Heel and sole output continues high and competition keen. Crêpe rubber soles are gaining rapidly in favor for sport shoes.

Mechanical rubber goods output is being curtailed by the usual seasonal decline, although certain lines are little affected. An unusually dry May and June have hastened the demand for garden hose. Wage agreements recently signed by the Massachusetts building trades seem to assure uninterrupted building activity for two years with a consequent good market for insulated wire.

Tire and tube production have been curtailed somewhat, not so much in response to the customary seasonal decline as to overproduction due to the lateness of spring buying caused by long protracted cold weather. Automobile topping business is a little less, but like the automobile market is holding up remarkably well.

This is a quiet time in drug sundries lines, but a good demand is reported for toys, novelties and bathing specialties. Waterproof clothing makers are fairly busy with standard goods and autumn samples.

Rubber Goods the Second Boston Industry

Next to boots and shoes, rubber products of one form or another constitute the second largest industry of the Boston metropolitan district, according to *Current Affairs*, the official publication of the Boston Chamber of Commerce. Boston is now the center of a $100,000,000 rubber goods industry in which nearly 25,000 men and women are engaged. Nowhere can one look for longer technical experience in the manufacture of rubber goods, and in no other section can a wider variety of rubber products be secured of local firms.

The manufacture of rubber began in New England generations ago and for two reasons centered about Boston. First, the raw material comes from abroad and the Yankee was the earliest foreign trader of the country. He had the spirit of adventure to go forth and get the rubber, and the resourcefulness and originality to exploit its use for many new purposes. Second, Boston was the first American city to specialize in boots and shoes, and the manufacturer of rubber footwear developed as an ally of the boot and shoe industry to which alone it now takes second rank. Almost half the rubber footwear made in the United States

comes from Massachusetts, a much larger proportion than of leather footwear.

But the energetic rubber manufacturers of metropolitan Boston have branched out into most of the products known to the rubber industry, and their business, in which tire manufacture has become an important part, embraces not only New England, but the entire country and considerable export trade. With low cost tidewater deliveries of crude rubber and cotton, manufacturing costs are such as to meet all competition up to the shipping of the finished product, so that Boston can look forward to an even fighting chance for a healthy share of the growing automobile tire business, not only in New England, but in the states west of the Hudson. In other branches of rubber goods manufacture, also, there is every reason to expect in this district a continuing and substantial development in a line in which Massachusetts men have so long shown a marked aptitude.

Dunlop Tires Reach New England

With a wholesale distributing branch at 200 Brookline avenue, Boston, twenty-two retail merchants in and around Boston, and responsible representation throughout Massachusetts and neighboring states, the Dunlop Tire & Rubber Co., of Buffalo, New York, is now supplying New England motordom with Dunlop cord tires.

Edward T. Richardson, Boston branch manager, has long been one of the most popular and successful tire salesmen in New England. Upon completing a special course at Cornell University he entered the Boston office of the United States Tire Co., in 1911. He went on the road in 1914, covering New Hampshire and Vermont, and the following year took charge of the Maine sales, with offices in Portland. In 1920 he was transferred to Rhode Island as branch manager and the following year returned to Maine as distributor of Hewitt tires.

Boston

It has been announced that chairman John H. L. Noyes, of the street commission, plans to experiment with rubber paving on the four streets bounding the City Hospital. The pavement to be tried consists of rubber blocks a foot long, four inches wide and two inches thick. The blocks are vulcanized together, having a smooth surface which is said neither to contract with the cold nor expand with the heat, and when wet to form a suction with automobile tires which prevents skidding. The decision to give rubber paving a trial follows an extensive investigation ordered by Mayor James M. Curley several months ago. While its initial cost is much higher than other pavements, its wearing qualities render it cheaper in the long run, and, if the experiment meets expectations, Chairman Noyes believes the time will come when rubber paving will be used extensively.

Samuel Cabot, president of Samuel Cabot, Inc., manufacturing chemists dealing in lampblack and coal tar products, accompanied by Mrs. Cabot and family sailed on the *Manchuria* from New York on May 24 for a tour of England and the continent.

The Mason Tire & Rubber Co. of New York, Inc., has opened a new sales branch at 348 Newbury street.

After twenty-seven years of important service with the United States Rubber Co., William Palmer has returned to Boston as assistant selling agent of rubber footwear. Beginning in the factory office of the Boston Rubber Shoe Co., Malden, he was after five years transferred to the selling department in Boston. He it was who originated the idea of demonstrating the manufacture of rubber boots and shoes to wholesale houses. For several years he spent considerable time traveling about with this demonstration and lecturing on rubber gathering and rubber footwear manufacture. Following several months of this work in Europe, in 1910 he was transferred to the general sales office in New York, where at various times he was in charge of footwear advertising and of the development and production of Keds.

Samuel Grow, of the Grow Tire & Rubber Co., has recently returned from a tour of investigation of business conditions in the South and reports a notable business boom developing below the Mason-Dixon line that means doubling of the sales of automobiles and tires. While the inland southern states are still mainly dependent on cotton, factories are springing up throughout the southeastern states, assuring constant prosperity whatever the condition of the cotton market may be.

With all of the available exhibit space sold for the fourth annual National Shoe Style Show, to be held in Mechanics' Building, July 9 to 12, inclusive, indications are that this year's show will be the largest and best ever held by New England shoe manufacturers. As in the past, rubber footwear, heels and soles will be well represented. A new and special feature this year will be the engagement of 150 young women, winners of beauty contest prizes in many parts of New England, as models for the display of footwear.

Massachusetts

Warren Macpherson, president of the Cambridge Rubber Co., Cambridge, accompanied by Mrs. Macpherson, has recently returned from a trip to Europe and the Middle East, where he gave attention both to the sales interests and raw material supplies of his company. He attended rubber auctions in Singapore and visited plantations in order to obtain first-hand information regarding the crude rubber situation. Much of the published news emanating from Singapore, he states, is colored by misleading propaganda intended to bolster up prices.

B. B. Currie, of the Revere Rubber Co., Chelsea, spoke on "Americanization in Industry" before the monthly meeting of the Industrial Relations Department of the Associated Industries of Massachusetts, held May 24, at Whitinsville, where the Department was the guest of the Whitin Machine Works.

At the annual meeting of the Hood Rubber Co., Watertown, Massachusetts, Frederic C. Hood was elected president of the company, succeeding Albert D. Bosson, who becomes chairman of the board of directors. The daily production of the Hood company is about 75,000 pairs of rubber shoes.

The Panco Rubber Co., Chelsea, Massachusetts, has been working day and night for the past three years producing about 2,000 dozen soles and taps daily. T. McKeon is superintendent.

The Rubber Trade in Ohio

Manufactured Goods

Current reports of overproduction which may necessitate the closing down of many rubber plants in this district within 30 days are regarded here as exaggerated. The consensus of opinion seems to be that when the demand lessens in the next two months production schedules will be cut from 10 to 25 per cent, which is the customary practice when seasonal slowdowns occur. This lessening of demand will not be caused by any decrease in consumer buying but will be caused by the dropping off of original equipment business on the part of automobile manufacturers. Manufacturers have about two months' supply of finished product on hand.

While tire production has been curtailed from 10 to 20 per cent in several Akron factories, the output in boot and shoe, rubber hose, and mechanical goods departments has steadily increased during the past month in response to heavy demand from buyers. In some plants tire builders and finishers are being transferred into the boot and shoe departments.

It is estimated that 65 per cent of the rubber soles and heels manufactured in the United States are made in this district. Besides the large domestic demand, the exports of rubber soled footwear have been considerably heavier this season than last year. In March and April 1,064,096 pairs were exported. The principal

markets have been in Argentina, Cuba, England, the Philippine Islands, and Mexico.

Republic Rubber Co., Reorganized

Retaining its original name, an otherwise new company, organized under the laws of the state of Ohio, will carry on operations as The Republic Rubber Co., Youngstown, Ohio. Republic "Staggered Tread" cord tires and a general line of mechanical goods will be manufactured. As the entire stock of the new company is owned by the Lee Rubber & Tire Corporation, the two concerns will in the future work together in the perfecting of plans for the marketing of both lines of products.

The officers of the new company are as follows: John J. Watson, Jr., chairman of the board; C. H. Booth, president; E. H. Fitch, vice president; A. A. Garthwaite, vice president; H. J. Stambaugh, treasurer; C. F. Garrison, secretary.

Board of Directors, as follows: C. H. Booth, J. H. Connors, H. E. Field, A. A. Garthwaite, E. H. Fitch, John T. Harrington, John Kearns, John J. Watson, Jr., L. A. Watts.

Akron Tire Production Curtailed

The Mason Tire & Rubber Co. has closed down temporarily in most departments. The solid and truck tire departments are the only ones operating at present. Rather than pile up a large inventory when orders slackened, officials decided to stop making tires for pleasure cars temporarily. It is predicted that the plant will be able to run at full capacity within a few weeks. The cold weather and late spring are believed to be largely responsible for the slow-up in the industry. Dealers' shelves became overstocked and they were forced to stop buying.

Another manufacturer attributed the curtailment to canceling of orders by some automobile manufacturers. This theory is borne out by the fact that several plants which cater to the original equipment business are now operating at 80 per cent capacity, compared with a peak production a few weeks ago.

Mohawk Tire & Rubber Co. has made a 20 per cent cut in tire production, while Goodyear production figures have been reduced several thousand tires a day. Goodyear is turning out about 28,000 tires daily, compared with 32,000 a month ago. Goodrich, General, and Miller are reported to be operating at near capacity. Goodrich is making 20,000 tires a day and 30,000 tubes, besides doing a heavy business in boots and shoes and mechanical goods. The third shift at Firestone's Plant 2 has been taken off, but officials say there has been little reduction in factory output. Most of the men have been given jobs in other departments. At Goodyear the third shift is working five days a week.

Truck Tire Developments

The Goodyear Tire & Rubber Co. has announced a 30 by 3½ cord tire especially designed for small trucks, indicating that the company believes that there is a considerable growing market for a small truck tire.

At the beginning of the year there were 200,000 trucks on American farms, and it is believed now that this number has been materially increased. During May truck tire manufacturers raised the price of solid and cushion tires from 7 to 13 per cent.

The truck tire market has only shown signs of revival during the past few months. During the boom period the truck tire business was considerably over-expanded, and even the revival of business last year was not sufficient to create a demand for all the trucks in the country. Truck tire production at the present time is far in excess of what it was at the same time last year.

The Bus Tire Business Expands

More than 100 cities in the United States, 12,000 schools, 56 street railways and 40 railroads, are now using the automobile bus as adjuncts to transportation facilities, according to figures compiled by the Miller Rubber Co. It is estimated that there are practically 40,000 busses in operation at the present time, although in some quarters this estimate is believed to be somewhat low.

The bus business is growing so rapidly that it is taking a more definite place in rubber company organizations, and special departments are rapidly being formed to look after the interests of bus tire buyers.

Until very recently bus tires were handled by truck organizations, but with the tire demand from busses now in excess of 1,000,000 a year, and growing, the importance of producing tires specially suited to the bus business is being realized.

The Mason Tire & Rubber Co. has recently placed on the market a new bus tire, which is the result of more than a year's experimentation and road testing. Several other companies are reported to be considering the production of bus tires.

Akron

The Rubber Engineering Co., formerly at 712 Second National Building, has removed its offices to 636 Second National Building, Akron, Ohio. The company specializes in the preparation of plans, estimates, and specifications for the construction and equipment of rubber factories. W. E. McCormish is president.

The Diamond Rubber Co. is now producing three types of tires: Diamond cord for passenger cars, Diamond heavy service cord for trucks and busses, and Double Diamond fabric tire. The sales for the 1923 season are reported to be nearly three times greater than for the corresponding period last year, the introduction of the new pneumatic truck line being credited for the increase.

The Kahnheimer Co., 15 Ohio State Bank Building, Akron, Ohio, which began operations about eight months ago, dealing especially in crude and scrap rubber, reports business as being beyond expectations with excellent prospects for the future. S. F. Kahnheimer is president.

The Silica Rubber Co., 211 South Broadway, Akron, was organized May 1, 1923, to manufacture Kin-sil-ite, a combination of mineral substances, claimed to be superior to hard rubber, particularly in the production of battery containers. An output of 1,200 battery boxes a day is contemplated, the manufacturing to be conducted for the present by The Seiberling Rubber Co. at its Barberton, Ohio, plant. The directors and officers of the Silica company are as follows: President, C. W. McLaughlin; vice president, Mathew Dettelbach; secretary, E. R. Kelly; treasurer, Dr. L. E. Sisler; general manager, H. L. Kinsley. Directors in addition to the above are: J. G. Robertson, L. C. Rockhill, and W. W. Sharp.

Richard W. Brouse was recently appointed sales manager of The American Tire & Rubber Co., Akron, Ohio. He had previously been connected for fourteen years with the B. F. Goodrich Co., where he had in turn held certain responsible positions.

Production by The Star Rubber Co., Akron, Ohio, has now reached the highest point in the history of the organization. At the factory three shifts are being maintained, while the plant is at present operating at capacity. The figures for the first four months of 1923 show an increase in tire output of 67 per cent over the same period of last year, and an increase in tube output of 166 per cent.

Ohio Notes

The address of the Cleveland office of the Link-Belt Co. has been changed to 329 Rockefeller Building, the building in which they have so long found quarters having again changed hands and its name.

The Hubbell Rubber Co. has been organized under the Common Law Trust as a trust estate, to distinguish it from the Ohio corporation of the same name, which formerly operated at Cleveland and Newton Falls and whose affairs are now being wound up through a friendly receivership. The new company has pur-

chased the property of the Rotary Tire & Rubber Co., Zanesville, and will manufacture the Hubbell super-tread cord tire, and the Rotary cord, a second grade tire. The officers are: Charles C. Hubbell, president; H. M. Donaldson, vice president; E. E. McCloud, secretary; T. B. Dilts, treasurer. These together with H. E. Elliott constitute the board of trustees.

The Second National Bank of Ravenna, trustee, has filed its petition against the Supreme Rubber Products Co., for money judgment and foreclosure of mortgage or deed of trust, and the appointment of a receiver is asked.

The Dayton Rubber Manufacturing Co., Dayton, Ohio, has appointed F. J. Redemann as manager of its New York City branch. Clarence W. Hamilton has been made manager of advertising and sales promotion at the factory.

Although continuing to operate under its present name, The Chillicothe Tire & Rubber Co., Chillicothe, Ohio, is now being maintained under the controlling interests of The Milan Tire Co., Wilmington, Delaware. The Chillicothe company, incorporated about three years ago, has at present the following officers: A. C. Hertenstein, president, and W. W. Boulger, secrecothe organization; G. W. Gish, vice president, and L. S. Dorsey, tary and treasurer. Executives of The Milan Tire Co. include: Milan D. Wilson, president, and also a director of the Chillisecretary and treasurer.

Having outgrown its original factory at Lorain, Ohio, The Barr Rubber Products Co. has purchased a factory building at Sandusky, Ohio, which is large enough to enable the company to take care of its steadily increasing business. The new plant has a floor space of 36,984 square feet, and is being equipped for the manufacture of an additional line of goods, including rubber balls, toy footballs and mechanical rubber goods. At the company's Lorain plant the products have been toy balloons, bathing caps, and various kinds of dipped goods. Capitalization has been increased to $100,000, and the company reorganized, the new officers being Nelt Barr, president, and R. J. Dorn, secretary and treasurer. The board of directors includes John D. Dorn, vice president; A. H. Babcock, J. M. Jones, D. S. Troxel, R. J. Dorn and Nelt Barr.

Rubber Trade in the Midwest

Vice President of the Federal Rubber Co.

Albert Y. Tucker, vice president of the Federal Rubber Co., of Illinois, Cudahy, Wisconsin, is a notable instance of the many alert men who entered the rubber industry in the lowest positions available and through the thorough school of the United States Rubber Co. rose to high executive work and finally to official positions with other prominent companies.

Born in Chelsea, Massachusetts, in 1881, and educated in the public schools there, he started in 1896 as office boy at the factory of the Revere Rubber Co. After filling various positions in the factory office, he was in 1905 transferred to the Chicago, Illinois, sales branch, where he remained until 1911, when he returned to become assistant to the general manager and assistant treasurer.

In 1913 he was transferred to New York, N. Y., as assistant to Elisha S. Williams, then president of the Rubber Goods Manufacturing Co. and the United States Tire Co. When Mr. Williams became vice president of the United States Rubber Co., in charge of the mechanical goods division, Mr. Tucker acted first as assistant general sales manager and later as assistant general manager of that division.

In May, 1922, he resigned to become vice president in charge of the mechanical goods division of the Federal Rubber Co. of Illinois, now a division of the Fisk Rubber Co., Chicopee Falls, Massachusetts.

His acquaintance throughout the mechanical rubber goods trade is wide and valuable, his warm friends many, therefore success in his new position is assured.

Midwest Rubber Manufacturers' Association

The meeting of the Midwest Rubber Manufacturers' Association held on June 12 at the Hotel La Salle, Chicago, Illinois, was the largest monthly meeting ever held in the history of the organization, there being ninety members and guests in attendance. The board of directors' meeting took place in the forenoon, at which matters of importance were discussed.

A luncheon was served at noon in the east room, following which Harvey S. Firestone was announced and without introduction the members arose and applauded. Mr. Firestone stated he would take the friendly reception as an approval of his action in attempting to stabilize and standardize new tire prices on a lower level. He said that during the month of May and part of June very little tire business had been done. The reason he believed was because there was no price list out and the con-

The Barr Rubber Products Co., Sandusky, Ohio

A NEW TYPE OF TEA OR SERVICE WAGON IS THE "SERVETTE," manufactured by the Herkimer Specialties Corporation, 10 Main street, Cold Brook, New York. It has four 7-inch swivel wheels equipped with solid rubber tires, and a shelf half way between the top and floor.

sumer did not know what price he paid for tires; and that the industry was going on without a price list as far as the consumer was concerned, and that he hoped that the action of his company would help to stabilize the tire industry to some extent.

Mr. Firestone in his talk regarding British restriction asserted that no government can justifiably restrict the production of any commodity and keep people out of work to satisfy a few stockholders. He predicted that the Stevenson act would finally be repealed and told how growers, among others, oppose the restriction. The duty of the rubber trade in America, he said, is to interest American capital in growing rubber under American control.

At the executive session held in the afternoon the question of forming a new association composed only of rubber manufacturers was discussed. Many members did not seem to favor this new organization, as they could not see where any more benefit could be derived from another association in the rubber industry.

Illinois

The Dryden Rubber Co., 1014 S. Kildare avenue, Chicago, Illinois, manufacturer of mechanical rubber goods is planning a one-story addition to provide 12,600 square feet additional floor space for offices. The mill room equipment is being increased and a concrete building is under construction to house new electrical equipment. The total cost of the improvements is estimated at about $150,000. The plant has been operating 23 hours daily for the past two years. Walter P. Barton is secretary-treasurer of the company.

The Western Rubber Mold & Battery Co., 321-323 N. Crawford avenue, Chicago, Illinois, has been purchased from receivers by P. J. Schramm, formerly president of the Automobile Utilities Corporation, and G. R. Ludwig, for several years secretary of the Tire Dealers' Association, and who is president of the new corporation. W. F. Hood is general manager and J. J. Hurley, superintendent. The company will continue to manufacture vulcanizing molds and tire shop equipment.

In order to meet the increasing demands, particularly in the central west, for "Albalith," lithopone, The New Jersey Zinc Co. has for the fourth time enlarged its plant capacity. The new plant, to be devoted to the production of this specialty, will be located at the works of one of the New Jersey Zinc Co.'s subsidiaries, The Mineral Point Zinc Co., in central Illinois. Plans call for the beginning of operations by January 1, 1924.

The Master Tire & Equipment Co., Moline, Illinois, will erect a two-story brick building to house equipment for the production of a specially processed rubber stock for the manufacture of heels and mats, with a later development of battery boxes and other specialties. Two 60-inch mills and one 66-inch calender will be installed, as well as eight or ten presses and the various other essentials of a complete mechanical rubber plant.

In order to secure larger quarters the Hewitt Rubber Co., Buffalo, New York, has removed its Chicago, Illinois, offices to 2023 South Michigan avenue.

Iowa

The Ott Rubber Co., Dubuque, Iowa, has purchased three acres of land at Railroad avenue and Salina street, and will erect a one-story plant with about 20,000 square feet of floor space. Machinery and equipment for the manufacture of inner tubes are being acquired and it is expected that production will begin about September 15.

Wisconsin

The Racine Horseshoe Tire Co., Racine, Wisconsin, at its annual meeting reelected its board of directors and the president and secretary of the company. The officers include: J. C. Lawrence, president; O. D. Hollenbeck, vice president; L. H. Shepherd, secretary; and R. H. Weins, treasurer. The board of directors includes: J. C. Lawrence, H. J. Haigh, Charles C. Hood, W. C. Crawford, H. H. Whitman, F. L. Sivyer, and J. W. Bate.

Indiana and Kansas

Under the name of the Clyde L. Rubber Co., the organization formerly known as The Super Tread Tire Co., South Bend, Indiana, is continuing the manufacture of cord tires, while the original incorporation $30,000 has been increased to $200,000. Officers of the Clyde Company include: C. L. Smith, president; E. S. Webster, vice president; and G. A. Farabaugh, secretary-treasurer.

Goshen Stamping & Tool Co., Goshen, Indiana, manufacturer of mechanical molds, is at present busy on rubber heel, mat, grommet and bumper molds. John H. Yoder is president, George B. Slate, vice president, and H. M. Hostetler, secretary, treasurer and general manager.

G. R. Wilson and Samuel Valentine are now working out of Kansas City, Kansas, in the interests of The Star Rubber Co., Akron, Ohio.

The Rubber Trade on the Pacific Coast

Los Angeles

The United States Rubber Co. has just begun the erection of a five-story brick building on the northeast corner of Eighth and San Pedro streets, Los Angeles. The ground floor will be used for executive, auditing, sales, sample, packing and shipping departments. An 80-foot loading and unloading platform will provide ample space for trucks. A hydraulic press will be installed for applying solid tires. A spiral chute will connect the upper floors with the shipping department. An electric dummy, two elevators, and a tube system will be features. A sprinkler system throughout will afford fire protection.

The present quarters at 923-27 S. Los Angeles street are entirely inadequate for the fast-growing business, and provision must be made for expansion. Among those associated with J. B. Magee, general manager, and to whom he gives much credit for the upbuilding of the branch are: H. O. Bock, manager of tire sales; G. Erickson, manager of clothing department; C. G. Tisdale, manager of footwear department; P. G. Gergen, manager of credit department; E. A. Branch, manager of mechanical, druggists' sundries, soles and heels department; A. J. Robinson, manager of tire department, and P. E. Conlon, manager of trade relations.

The third anniversary of the opening of the factory of the Goodyear Tire & Rubber Co. of California, was celebrated on June 14 at the Los Angeles plant, and thirty-five of the leading tire dealers of the city were guests at a luncheon attended by the chief officials of the company. The company has prospered and has considerably strengthened its financial position. The mid-month daily tire production was 3,800, although the average a day since January 1 has been fully 4,500 tires. Tubes average 4,800 daily.

Until a gas like helium can be produced as cheaply as hydrogen, makers of rubber toy balloons are likely to find Los Angeles a poor market for their goods. The City Council has passed an ordinance forbidding the sale of any such balloons filled with combustible gas.

What is said to be the largest single order for jar rings ever given by a Pacific Coast concern, an entire carload, has just been filled for a Southern California grocery company which operates 141 stores.

The United States Rubber Co. will distribute its solid tires in Los Angeles through the Pacific Rubber Co., which recently moved into its new building at Eighth and Wall streets, and in which it has the latest equipment for applying solid tires.

Nelson & Price, 1056 South Olive street, Los Angeles, is specializing on the Golden State cord tire made especially for the firm.

The Hendrie Rubber Tire Co., Torrance, near Los Angeles, is forging steadily ahead. Its equipment for producing casings is now taxed to capacity, and it will shortly add facilities for producing tubes.

J. P. Cahoon, recently Kelly-Springfield Tire Co. branch manager at Albany, New York, is now managing the Los Angeles branch, succeeding F. C. Harris.

Rapson tires, made in England, are being distributed in Southern California and Arizona by Harold L. Arnold, Inc., Los Angeles.

The Samson Tire & Rubber Co., Compton, Los Angeles, has declared a dividend of 2 per cent, or 10 cents a share, on 200,000 $5 shares. The company plans to go on full production on July 1. Plant additions have brought capacity up to 1,000 units daily.

San Francisco

The B. F. Goodrich Rubber Co. has moved into its new building at 2nd and Brannan streets, San Francisco, a structure of five stories, affording 55,000 square feet and having spur track loading facilities. W. T. Powell is manager.

The Airless Cushion Tire Co. has opened a shop and salesroom on Hughes avenue, Oakland, with Leo Cartier in charge.

C. H. Boyer, western district manager for the General Tire & Rubber Co., Akron, Ohio, has been making a business tour of the Pacific Coast and the Hawaiian Islands.

R. H. Daniells, representative of the Goodyear Tire & Rubber Co., was in conference recently with the company's agents in Honolulu.

F. H. Myers, director of sales of the Fisk Tire Co., New York, has lately been studying trade conditions on the Pacific Coast.

The golf tournament to be held under the auspices of the Pacific Coast Mechanical Rubber Men's Golf Association and scheduled for June 4 and 5, has been postponed to October 8 and 9 of this year. All trophies donated will be held for this autumn tournament.

At a conference which took place June 6 of the creditors holding leading claims against the Coast Tire & Rubber Co., 50th avenue and East 12th street, Oakland, California, two committees were appointed, with the following as chairmen: S. H. Kitto, vice president, First National Bank of Oakland, creditors' committee; Erwin C. Easton, California Commercial Union Building, San Francisco, stockholders' committee.

The Mason Tire & Rubber Co., Portland branch, reports business during the first four months of the present year as being unusually active. Notwithstanding somewhat of a decline since that period the prospects for the future are now most encouraging.

In order to secure more space for both offices and warehousing the Hewitt Rubber Co., Buffalo, New York, has moved its San Francisco, California, offices to 630 Third street.

The Northwest

Thomas Lindsey, sales manager of the Kelly-Springfield Tire Co. of New York, has been noting business prospects in Portland, Oregon; Seattle, Washington, and other coast points.

The United States Rubber Co. has opened at Butte, Montana, a sub-branch of the Spokane, Washington, office, in charge of H. K. McIntyre.

An average of 150 tires a day is being made by the Columbia Tire Corporation, Kenton, near Portland, Oregon. Fabrics include 30 by 3 and 30 by 3½ sizes. All other casings are standard sizes in cord. A. H. Aya is vice president and general manager.

The Fisk Tire Co., Inc., having consolidated with the Federal Tire Sales Co., has taken larger quarters at Flanders and 13th streets, Portland, which will be northwest headquarters for both concerns, according to Manager McMartin.

The Southwest

Fred Nash has been appointed corporation sales manager of the Spreckels "Savage" Tire Co., of San Diego. He had been chief salesman for Orange County and is succeeded in that field by H. Gordon Platt, adjuster in the Spreckels factory. W. S. Cibray, for three years San Diego city branch manager, is now special sales representative at the factory.

Colorado

The Gates Rubber Co., Denver, Colorado, reports sales figures for 1922, as being $4,174,376, as compared with 3,902,588 in 1921. Figures for the first quarter of 1923 show an increase of 154 per cent over the same period of last year in the amount of tires sold. Charles G. Gates, president of the company, has been elected president of Greater Colorado, Inc., an organization committed to a program of state development and providing a direct channel of communication between the business centers of the state.

RUBBER IN AERONAUTICS

A contributor to the *Gummi-Zeitung* gives some interesting data regarding balloons, airships, etc., and the use of rubber in the covering. In 1783, a few months after the Montgolfier brothers had successfully launched their balloon by inflating it with hot air, the brothers Robert, under the superintendence of the French physicist J. A. C. Charles, constructed a balloon, 13 feet in diameter, of thin silk varnished with a solution of rubber. The balloon, which was filled with hydrogen gas, ascended from the Champ de Mars, Paris, to a height of about 3,000 feet and remained in the air about three-quarters of an hour.

Balloons of pure rubber are now used in meteorological researches up to certain heights. These balloons have a diameter of 2 meters (about 6½ feet), are made of the finest thin sheet rubber and can be inflated to twice their original diameter. Such a balloon, filled only to a certain extent, can reach a height of from 17,000 to almost 20,000 meters.

Rubber is also used for valves, rings, bands, cards, shock-absorbers, to say nothing of tires. It often takes the place of leather in the clothing used in traveling through the air, while rubber bags and packets hold the airman's food. Rubber cables are employed to start the new motorless flying apparatus. Parachutes and balloons are packed in rubber bags to protect them from moisture.

The oldest local firms making rubberized cloth for airships, balloons, airplanes, etc., are: Continental Caoutchouc & Gutta Percha Compagnie, Hannover; Franz Clouth, A.-G., Cologne; Harburger Gummiwarenfabrik Phönix, A.-G., Harburg A.Elbe.

A NEW IDEA IN ELECTRICAL GOODS IS THE PACKAGED CORD SET. The Beaver Machine & Tool Co., Inc., 50 Church street, New York, N. Y., is putting out in cartons three types known as the Beaver Gripall heater plug, switch plug, and heater plug with feed through switch attached. Each is provided with 7 feet of asbestos-covered cord and a 2-piece attachment plug.

THE NEW TOY RUBBER BALLOONS IN GOLD AND SILVER, WHICH The Oak Rubber Co., Ravenna, Ohio, is offering to the trade are especially beautiful in appearance. The balloons are made up in both round and airship shapes, and the gold and silver bronzes in combination with pure gum rubber make a very effective background, also, for trademarks and advertising designs.

OUR EXPORTS OF MECHANICAL RUBBER GOODS ROSE IN MARCH, 1923, to a total value of $409,604, the figure for February being only $277,916. The total for April is estimated at $320,337.

American Rubber Manufacturers, Inc.

Under the above title a new association, devoted to the interests of the rubber manufacturer, was formed on June 15 at a meeting held at the Hotel Commodore, New York, N. Y. In attempting to meet the problems and further the interests of the rubber manufacturer the new organization goes on record as believing in liberal production and free movement of crude rubber, unhampered by legislation that creates an artificial price for the product.

The following were appointed as executives of the new association: President, T. R. Palmer, Continental Rubber Works, Erie, Pennsylvania; treasurer, C. E. Murray, Murray Rubber Co., Trenton, New Jersey, and secretary pro tem. O. M. Mason, Mason Tire & Rubber Co., Kent, Ohio. The board of directors includes, in addition to the above officers, H. S. Firestone, Firestone Tire & Rubber Co., Akron, Ohio, and L. A. Brown, Firestone-Apsley Rubber Co., Hudson, Massachusetts.

While no announcement has been made regarding the membership of the new body, it is understood that the following companies have become affiliated: Continental Rubber Works, Firestone Tire & Rubber Co., Lee Tire & Rubber Co., Manhattan Rubber Manufacturing Co., Mansfield Tire & Rubber Co., Mason Tire & Rubber Co., Murray Rubber Co., Nebraska Tire & Rubber Co., Quaker City Rubber Co., Racine Horseshoe Tire Co., and Samson Tire & Rubber Corporation. Several other organizations have expressed their intention to join.

Firestone Tire Price Reduction Explained

The 10 per cent reduction in tire prices on June 11, by the Firestone Tire & Rubber Co., is said to be one of the outstanding results of the opposition led by Harvey S. Firestone against the British crude rubber restriction act. The company's announcement follows:

"The crude rubber monopoly weakened when it came in contact with aroused public sentiment. The press of the country today reflects the determination of the American motorist that tire prices shall stay at a reasonable level—and that America must produce its own rubber.

"It is generally conceded by press and public that the activities of Mr. Firestone, waged to protect motorists and other rubber consumers from the grip of a foreign monopoly, are ranked among the great commercial and patriotic achievements of the present generation; for the restriction legislation was designed to extract millions of dollars from the pockets of the American people.

"While Mr. Firestone was practically unaided, and in some instances was actually opposed by certain manufacturers of rubber products, he set out to counteract the artificial stimulus given prices of crude rubber by a group of powerful British rubber growers, whose program was greatly aided by the English Government through the passage of laws restricting production. Although the Rubber Association of America claims to represent 80 per cent of the rubber industry of this country, it decided to take no aggressive action against the unwarranted legislation, and Mr. Firestone proceeded to carry on his campaign practically single-handed.

"He sent representatives to England and set in motion a movement through the newspapers and other agencies against the legislation, with the result that a Parliamentary investigation of the situation was ordered. The agitation aroused reflected itself in the Far East, where the British crude rubber is grown.

"In America Mr. Firestone's activities were instrumental in bringing to the attention of the government the necessity of this country looking to new sources of rubber supply, and as a result Congress appropriated a half million dollars for that purpose. The interest of automobile manufacturers and other industrial enterprises, as well as of the automobile owners of the country, was aroused. The critical situation in which America was placed was made known to all having our nation's welfare at heart.

"South American countries, the 'home of rubber,' were induced to offer conditions that would attract plantation capital, while encouraging reports came from the Philippines where the opportunities for progress and the development of a big, new industry were seen.

"These various phases of the situation were reflected in the crude rubber market, the price now being around 28 cents a pound, while immediately following the announcement of the restriction legislation last October the price of plantation rubber advanced from 14 cents to 37 cents a pound.

"The increase last fall to 37 cents a pound was not based upon the natural economic laws of supply and demand, but upon manipulation and speculation in the market, where a shortage was anticipated. The rubber growers, who had also secured control of the administration of the legislation through the British Colonial Office, became alarmed at the growing public sentiment aroused by Mr. Firestone's activities, and the result was that much more rubber was forthcoming from the British restricted possessions than the most optimistic estimates predicted at the time of the enactment of the legislation.

"'The British rubber growers responsible for the legislation either cannot or do not wish to control the situation and enforce the law to the letter,' said Mr. Firestone, 'because from information I have gathered I believe they now fear the results of strict enforcement, as it would cause a shortage of rubber and naturally strengthen those of us who are opposing the law. The restriction act provides that only 60 per cent of normal (1920) production shall be exported, but as a matter of fact close to 100 per cent is coming from the restricted area.'

"The reduction in crude rubber prices means a saving of many millions of dollars to American consumers, who otherwise would have had to pay tribute to a small group of rubber plantation shareholders in London.

"It is this lower cost of crude rubber and further economies in manufacturing which Mr. Firestone says have enabled his company to announce a 10 per cent reduction in tire prices at this time."

TIRE PRICES CUT

A blanket cut of 10 per cent on all casings and tubes, and effective June 11, as announced by the Firestone Tire & Rubber Co., Akron, Ohio, was a surprise to the industry. Following the Firestone cut the Miller Rubber Co., Akron, Ohio, declared on June 14 a decrease of from 7 to 10 per cent on all its tires of passenger car size, while the day after, the Mason Tire & Rubber Co., Kent, Ohio, also announced a reduction in the prices of its tires and tubes. A cut of from 5 to 15 per cent was a few days later made by the Pennsylvania Rubber Co. of America, Jeannette, Pennsylvania. Dealers handling the products of the Goodyear Tire & Rubber Co., Akron, Ohio, have been informed that new prices on tires and tubes which will be fairly competitive have been prepared, and that they will be effective as of June 11, with standard rebates. The Hood Rubber Co., Watertown, Massachusetts, has announced a tire and tube price cut, effective June 22, of from 7 to 15 per cent.

Effective June 11 are the new prices lately announced by The B. F. Goodrich Co., and said to be on a competitive level with the recent Firestone cut. The United States Rubber Co., has announced reductions, averaging about 11 per cent in casings and tubes, while a ten per cent reduction is also made in solid truck tires. The Fisk, Federal, General, Lee, and Racine organizations are also said to be considering revisions of their tire prices.

CHILE CONTINUES A STEADY CUSTOMER FOR OUR MECHANICAL rubber goods, the values for this year being: January, $13,055; February, $12,074; March, $23,241; and April, $11,339.

The Rubber Trade in Great Britain

By Our Regular Correspondent

An Aftermath of the Restriction Scheme

THE justification of those who advocated caution in the buying of rubber shares when the rise took place, consequent upon the rise of the raw material to near the 1*s.* 6*d.* mark, has not been long delayed. The set-back which has occurred in the market in spite of the fact that visible stocks have been declining for four months has come as a surprise to many investors in England and Scotland who are now becoming aware that the rise was largely due to unwarrantable speculation, as is shown by one or two recent failures in Mincing Lane. It is a drawback of the restriction scheme that it contains all the elements to foster the gambling instinct, though this, of course, is not to be attributed to its sponsors. It rather looks as if we shall witness periodic quarterly fits of optimism in the share buying public, followed by periods of depression following the oscillation in the price of rubber.

It cannot be said that the scheme as a whole has developed exactly as its promoters expected, the market estimates of the world's consumption having led people to suppose that the floating stocks would be absorbed in twelve months, with the prospect of a shortage thereafter. No account seems to have been taken of the stimulus which a rise in price would give to the American reclaiming industry, and also of leakages from producing areas. The two factors have combined to reduce the expected figure for consumption, hence the fall in price and the fall in share values. From an insular point of view it is a regrettable feature that the restriction scheme has conferred a bonus upon non-British companies who are outside the scheme. That they have prospered by it is seen in the greater relative rise which has occurred in the shares of companies located in non-British territory than in those of Colonial companies, the former being of course able to sell the whole of their output at any rise in price resulting from British restriction. Had the scheme not been in operation all would have been in the same boat. The probability is that the next rise to near 1*s.* 6*d.* per pound will not find the public so eager to buy the shares as was the case last time.

The Institution of Rubber Industry

At a London meeting held in May, P. J. Burgess, chairman of the Rubber Growers' Association, read a paper on "Plantation Rubber." Alexander Johnston, president, was in the chair and the attendance was representative of all sides of the industry. The paper consisted largely of a historical review of the origin and development of the planting industry, the author saying that his task was not rendered any the easier by reason of the fact that he had no new facts or figures to put forward. A good feature, he thought, was the community of interests between planters who in effect pooled all their experience, knowledge and research. No trade secrets existed and practically no rivalry, an essential difference from the manufacturing side of the industry thus being apparent. The policy of individualism pursued on the manufacturing side had, he thought, something to do with the fact that Great Britain absorbed only about 7 per cent of the rubber output. The restriction scheme, he claimed, had changed the whole outlook of the quarter of a million shareholders in Great Britain and in place of pessimism created confidence and hope.

Referring to his recent visit to the U. S. A. he said he was grateful for the opportunity afforded him of meeting the American rubber manufacturers and of seeing their works and realizing the magnitude of their interests. It was gratifying that the great majority of the manufacturers agreed with him as to the necessity and importance of the restriction scheme, though they would have preferred it to have been brought about without government aid. There was still urgent need for a stimulation of demand if all the rubber that could be produced was to be absorbed; the industry was at present too much dependent upon the tire trade. He regretted that their manufacturers had not cooperated in cash to the proposed publicity campaign for extolling the merits of rubber goods; it was necessary, he was convinced, for growers and manufacturers to come to regard each other as partners and not as competitors. Samples were shown of rubber goods made by the Peachey and Schidrowitz processes, also of Onazote, the gas-expanded rubber.

The chairman in opening the discussion thought that that was a good opportunity of healing any breach which might have arisen between the manufacturing and growing interests. He must confess to a feeling of jealousy towards the growers at having obtained protection for their industry from a British government. It was quite a new departure for a British government to take and those who had asked for protection against the import of foreign tires only wished they had been equally successful. The British manufacturers had their home market assailed by foreign manufacturers while it was becoming increasingly difficult to sell their goods in the highly protected markets of other countries. These considerations accounted for their consumption of rubber being only a small percentage of the total output.

Ernest Hopkinson, vice president of the United States Rubber Co., paid a tribute to the British rubber planters who had made possible the present state of the American manufacturing industry. Stability of price was desirable and this should be controlled by supply and demand and not by methods which were tremendously affected by speculation. In the development department of their works they had been trying to find new uses for rubber and he was inclined to think that the latex phase of the problem had quite important possibilities.

Manchester Meeting

At a Manchester meeting held in May, Dr. Schidrowitz read a short paper entitled "Education and the Question of a Diploma in the Rubber Industry," in which he gave a synopsis of the rubber courses at the Northern Polytechnic Institution in London and then referred to the question of granting a diploma to rubber workers, this being a matter now under consideration by a special committee of the Institution. The scope and method of training, he said, would naturally vary according to the previous qualifications and aim of the individual, as it could not be considered necessary for the foreman of a mill department or of a compounding room to go through the syllabus essential for a rubber chemist even if he were qualified to do so. He was aware that some held the opinion that the proper place for the training of a rubber chemist was the rubber works and that the rest would naturally follow upon a sound theoretical training in science. With this view he disagreed, as it did not take into consideration modern conditions, rubber science being now highly specialized, and this could be learned to better effect outside the works than within it. Turning to the discussion of the diploma scheme he said the time had not arrived for any authoritative pronouncement and he was only expressing his personal views and opinions that evening. These opinions were obviously in favor of a diploma.

Having sketched what are in general common features of institution diploma schemes Dr. Schidrowitz instanced the Institute of Brewing, to which he belonged, as resembling more nearly than many others the Institution of Rubber Industry and he

thought the granting of diplomas of efficiency which had worked well in the former case might be copied with advantage in the latter. An essential feature was the passing of a preliminary examination in general knowledge not undertaken by the Institute. Such diplomas, he contended, had been advantageous to the other institutions by rendering them weight and authority and had benefited competent individuals by providing them with a hall-mark of technical efficiency. The essential feature of a diploma as distinct from a university degree was that it should afford evidence of practical experience.

In the ensuing discussion, which was on the whole favorable to the idea of granting diplomas, H. Hatton said that he did not see that the scheme had any special advantages. Most manufacturers employed a chemist with chemical qualifications and what was it proposed to add in order that he might gain the rubber diploma. Then there was the case of the old-fashioned men brought up in the trade and who had acquired vast practical experience. Though these men deserved the diploma he doubted whether they could be persuaded to undergo an examination in order to obtain it. They were experts in their several departments and where was the examiner to be got to test them.

L. G. Radcliffe, a visitor from the Manchester College of Technology, said they had an extensive rubber equipment and were willing to engage a lecturer but a circular sent out to 153 rubber manufacturers asking what support they were likely to obtain brought only nine replies, and of those only one gave them encouragement. H. L. Terry suggested that Mr. Radcliffe had circularized many firms who were not rubber manufacturers in the real sense of the term. Indifference or even hostility might also be due to the well-known conservatism of the trade manufacturers not wishing their men to come into touch with others engaged in the industry. It was this embargo which had prevented many from joining the Institution. He quite agreed with Mr. Hatton as to the difficulty with regard to the old experienced foremen who were a bulwark of the trade. Among the speakers was E. Healey, chairman of the India Rubber Manufacturers' Association, who had just returned from a business trip to the Far East.

Company News

The prospectus of Peachey Leather Products, Limited (already referred to as imminent), was issued on May 28, the capital, £150,000, offered to the public having been underwritten to a great extent by the directors, who, with the exception of C. S. Baring-Gould, differ from the board of the Peachey Process Co., Limited. It is stated that inquiries from prospective customers such as leading stores and furnishing houses, motor body manufacturers, railway and steamship companies, bookbinders, boot and shoe manufacturers, etc., indicate that orders will be forthcoming as soon as the goods are available in bulk. Premises have been secured at Slough (near the new location of the St. Helena Cable & Rubber Co., Limited), and it is stated that a complete unit of plant estimated to produce 660,000 yards of material per annum can be installed by the end of September next, a low-cost power installation being already established. There are no promotion profits, the only payments to the Process company being royalties depending upon the success of the company. The cost of the new plant is put down at £25,000 and the working capital available at £88,000. Technical opinions on the value of the process appear in the prospectus from Dr. H. P. Stevens and Frederick Kaye, and some views of T. A. Edison expressed in the *India Rubber Review*, of Akron, are stated as being an "extract from the *India Rubber Journal*, of New York, August 6, 1921. Presumably THE INDIA RUBBER WORLD is meant.

The Wood-Milne Tyres & Manufacturing Co., Limited, has been formed to acquire the Ajax Rubber Works at Leyland, Lancashire, the original seat of the Wood-Milne products manufacture. It will deal only with the Wood-Milne solid tires and foot pumps as at present made, but various developments are forecasted, such as a new type of pneumatic car and motorcycle tire, as well as the manufacture of mechanical goods, rubber flooring and golf balls. The board is a strong one: R. A. Warkman (Warkman, Clark & Co., Limited); William Barnes (R. Barnes & Sons, Rochdale); Lt.-Col. the Hon. S. Playdell-Bouverie (director of Wolesley Motors, Limited); Sir J. P. Hewett, G.C.S.I. (director of General Electric Co., Limited); Sir H. Verney, Bart. (director of Metropolitan Railway Co.). The managing director is H. B. Potter, recently joint managing director of Wood-Milne, Limited. G. Spencer Moulton & Co., Limited, which is associated with Wood-Milne in the Federated Rubber Growers & Manufacturers, Limited, is not concerned with the company under notice, the capital of which is stated to be £600,000.

Callenders Cable & Construction Co., Limited, report another good year and again pay 15 per cent. Johnson & Phillips show an improvement on the preceding year while Siemans Bros. Co., Limited, have an unsatisfactory showing to make, for while the profit in 1921 amounted to £200,993 and a dividend of 10 per cent free of tax was paid, the profit for 1922 was only £14,041 and there is no dividend on the ordinary shares or on the 10 per cent preference shares for the last six months of the year.

The Craigpark Electric Cable Co., Limited, a Glasgow concern, has a net profit of £10,842 for the year ending March 31, which, after allowing for the preference dividend of 6 per cent, permits of a 12½ per cent distribution on the ordinary shares.

Belgrave Standard Tyres, Limited, with registered offices at Honeywell Lane, Oldham, has been formed to amalgamate under one sales organization The Standard Tyre & Rubber Manufacturers, Limited, and the Beldam Tyre Co. (1920), Limited, among the directors being W. Greenwood, M.P. (chairman), Sir W. H. Lugden, M.P., and G. W. Beldam. Although closely connected the two concerns have hitherto had separate organizations.

Reports which have been current anent Lord Colwyn getting hold of a new milk product which is to be a formidable rival of vulcanite now find confirmation in the registration of a new private company called Casoid, Limited, with a capital of £35,000 in £1 shares (20,000 6 per cent non-cumulative preference and 15,000 ordinary). Lord Colwyn, P. A. Birley, and L. Brown, all of Chas. Macintosh & Co., Limited, are the first directors and this latter company guarantees the dividend on the preference shares for each of the three years ending March 1, 1925, 1926 and 1927. The new company acquires the trade mark "Casoid" and inter alia is to carry on the business of manufacturers of and dealers in vegetable casein and milk products and by-products of milk and rubber, glue and casein rubber, vulcanite, etc. Other milk products, such as galalith, have, of course, been manufactured for some time but "Casoid," which may not form the subject of a patent, would seem to be a combination of rubber and casein. In recent times certain combinations of casein with non-rubber materials have found commercial application, and judging from the personnel of the company which has acquired "Casoid" we are likely to see important developments in the use of milk and rubber and quite unconnected with those of rubber milk.

GEORGE HANKIN & CO., DEALERS AND IMPORTERS, HANDLING crude rubber, balata, gutta percha and liquid rubber latex, recently removed their offices from 27 to 21 Mincing Lane, London, E. C. 3.

ENGLAND CONTINUES, AS IN THE YEAR PREVIOUS, THE LEADING customer for our rubber thread. For the first four months of 1923 the steadily increasing values are: January, $26,302; February, $34,851; March, $38,433; and April, $56,640. The figures representing the leading purchasers for the entire year of 1922 are: England, $577,127; France, $338,339; Japan, $117,871; Italy, $44,-619; and Quebec and Ontario, $39,568.

The Rubber Trade in Europe

By Our Regular Correspondent

France

Reports from French Soudan state that the natives have taken up the now remunerative business of collecting rubber, which they had abandoned for some years. The quantity offered to local traders is small and the quality far from perfect. The rubber is moist and filled with impurities, while the crêpe, which according to regulations laid down in 1912 should not exceed 1 centimeter (less than half an inch) in thickness, is now exceedingly thick, often being 4 to 5 centimeters (about 1½ to 2 inches) thick.

Michelin Tire Discounts

The Michelin company allows a trade discount of 10 per cent to retailers in France and assumes the additional 1.1 per cent business turnover tax. An extra 5 per cent is granted those whose business exceeds a certain minimum and 10 per cent where the annual turnover reaches 50,000 francs.

While the retail price of a 30 by 3 cord is 136 francs, and of a 30 by 3½ cord, 179 francs, the wholesale price to retailers securing the extra 10 per cent discount is about 108.8 francs for the smaller size and about 143.2 for the larger.

Congo Rubber Report

The Sultanats du Haut-Oubangui (Congo) reports that rubber production for 1922 amounted to 100 tons. During the first half of 1922, when rubber yielded no profit, the company had issued orders to stop all collecting of rubber and it was not until the beginning of September that the order to purchase rubber was sent out, so that a considerable increase in the quantity of rubber gathered by this company in 1923 may be looked for, especially as prices have more than doubled.

Switzerland

Most of the rubber footwear now sold in Switzerland comes from America. During 1922, Switzerland imported a total of 79,700 kilos, valued at 543,000 francs, of which America supplied 48,600 kilos, value 303,000 francs; France, 10,700 kilos, value 68,000 francs; Germany, 7,200 kilos, value 59,000 francs; Sweden, 5,200 kilos, value 67,000 francs; Austria, 4,300 kilos, value 25,000 francs; and other countries, 3,700 kilos, value 21,000 francs. In 1921, the total imports of rubber footwear amounted to 65,200 kilos, value 592,000 francs.

The outlook for the sale of American tires here is good because quality and recent low prices have been a good advertisement for them. Michelin and Continental tires respectively occupy first and second place on the sales list here; then come two American tires, Dunlop, Goodrich (French), and Harburg-Wien following in the order named.

Tire Trade in Spain

American tires enjoy a favorable reputation in Corunna and its environments, holding first, third, and fifth places in the city itself, with Michelin second, Nacional fourth, and Dunlop sixth. The usual dealer discount is 20 per cent, but the leading American firm gives 25 per cent and the Spanish Nacional allows 40 per cent.

Tire exporters wishing to enter the Spanish market should first ascertain how much business could be secured and accordingly decide how much to spend on preparing for a sales campaign. An export manager should be sent to the country to study local conditions and requirements and to gather necessary information.

European Tire Competition

Michelin is the strongest competitor American manufacturers have to face in Europe. In England, Austria, Switzerland, Roumania, and parts of Italy (Leghorn) Michelin leads. In Switzerland, Spain, Roumania, Continental runs Michelin a close second; the German tire is also popular in Eastern Europe. Dunlop tires come fourth or fifth in many European States. In Southern Europe, Pirelli products are well-liked. In some cases, for instance in Italy and Roumania, the rate of exchange hampers American sales; in the latter country transportation charges also prevent American tires from being better established in the local market.

Frequently Americans lose business because they are in the habit of placing several qualities of tires on the market. In Europe generally, the name sells the tire. When a consumer is satisfied with a certain tire he continues to buy it. However, if he should happen to buy a cheaper grade made by the same manufacturers, and this gives unsatisfactory service, he indiscriminately condemns all tires put out by the firm.

Poland's Rubber Industry

Poland has no factories for the manufacture of rubber surgical goods, so that it is a good field for these articles—for German manufacturers who dominate the market. Up to the present, wholesalers were not combined in any kind of association and there was no price regulation. Business men in this branch have now decided to form an association to control prices. Members of this association may not buy goods from factories who do not belong to this new body. Besides wholesalers, the representatives of the following German firms are directors of the new convention: Continental Caoutchouc & Gutta Percha Compagnie, Hannover; Dietsch & Illgen, Zeulenroda (Thüringen); Otto Dillner, Leipzig; Hannoversche Gummiwerke Excelsior A.-G., Hannover; Phil. Penin A.-G., Berlin-Leipzig; Vulcan-Werke A.-G., Leipzig.

There is one tire factory here organized about two years ago in Posen under the name of Pneumatyk and built by a group with previous tire experience in Belgium and reported to have Belgian backing. Only metric-sized solid tires are produced at present but the company is planning to equip for the manufacture of pneumatic tires.

Recently orders for tires for the Army have been placed with the French Michelin company by the local Ministry of War. American companies are said to have quoted lower prices and their tires were satisfactory in all respects; however, the French Military Mission here succeeded in getting the orders for Michelin.

Germany

The official rubber statistics of Germany for 1922 show that the imports of crude rubber, mainly from the Dutch and British colonies in the East, amounted to 287,955 quintals, valued at 9,982,858,000 marks. Imports of manufactured goods were very small, totaling 4,142 quintals at 232,724,000 marks, the most important item being tires—2,217 quintals, value 49,235,000 marks. Rubber footwear was the least significant item separately listed, the figures being: 5 quintals, value 89,000 marks.

The exports of manufactured goods totaled 169,756 quintals, valued at 17,756,607,000 marks, and included: Tires and tubes, 44,182 quintals, value 3,621,535,000 marks; belting, hose and packing, 26,111 quintals, value 1,840,382,000 marks; rubberized and woven elastic goods, 11,560 quintals, value 3,705,901,000 marks; footwear, 5,757 quintals, value 471,706,000 marks; hard rubber goods, 7,439 quintals, value 2,241,058,000 marks.

While 1922 imports were only about 10 per cent of 1913 imports, 1922 exports were but 13 per cent below 1923 quantities. From this it is clear that while the German export trade has recovered to a notable degree, home consumption is still at a very low level.

German Tires in Danzig

Continental tires are extensively advertised and demanded in Danzig although American tires are superior and compare favorably with the German makes as regards price. At present the material in German tires is poor. The leading makes sold here are Continental, Peters-Union, Harburg-Wien, Excelsior, one

American tire, and the Dutch tire, Vredestein. At present exchange rates Continental tires sell at prices equivalent to the following: Fabrics, 760 by 90, $13.80; 815 by 105, $17.85; 820 by 120, $23.70; cords, 760 by 90, $17.02; 815 by 105, $22.00; 820 by 120, $29.02.

Technical Exposition in Hannover

The first technical fair held in Hannover, the Akron of Germany, was more successful than expected. From all parts of Germany exhibitors flocked to the town; fully twice as many applied for space as could be accommodated. Besides a variety of goods like belting, hose, packing, covers for rolls, machines, etc., a great number of tires for all kinds of vehicles were shown. The success of the fair indicates that it will be followed by others of its kind in the future.

Austria

The Austrian rubber firm, Semperit Oesterreich, Amerikan, Gummiwerke, A.-G., reports a profitable business year. Although costs for raw material were high and wages increased, it booked net profits of 3,152,030,885 kronen for the year. Of this, 1,125,000,000 kronen were distributed among shareholders and 653,796,306 kronen among the employes of the firm. Owing to increasing expenditure the capital which had already been raised from 50,000,000 kronen to 250,000,000 kronen was further increased to 500,000,000 kronen.

The Rubber Trade in the Far East

By Our Regular Correspondent

Malaya

RESTRICTION has now been in force six months and a review of the results attained is now in order. The immediate effect was to advance prices; the average price for first grade rubber in November, 1922, was 44 cents (Straits currency), which rose to 49 cents in December, and to 62 cents in January, where it remained through February. In March the average fell to 59 cents, and in April to 56, the actual price for first latex crêpe toward the end of April being 53½ cents; since then it has continued to decline.

The export figures under restriction for the six months beginning November, 1922, and ending April, 1923, totaled 130,500 tons as compared with 108,994 tons during the same period of 1921-1922. For the first four months of 1923 the exports were 90,433 tons and during the corresponding period of 1922, 72,700 tons. Thus, with 40 per cent restriction statistics actually show an increase of about 21,000 tons for the six months and 17,733 tons for the first four months of 1923! This explains the drop in prices. Many planters view with apprehension the release of a further 5 per cent warranted by the average of the prices obtained during the second quarter of the restriction period.

What is not quite so clear as the reason for the setback in prices is how, with 40 per cent restriction, shipments could have increased at the average rate of over 4,000 tons a month. The increases during November and December were explained by the anxiety of owners to reduce stocks withheld because of low prices. However, the increase during the first four months of 1923 has been at a greater rate than during the preceding two months.

The shipments from Malaya include reexports of rubber from the Netherlands East Indies, and these have increased considerably, although many large British-owned estates have voluntarily introduced restriction. Thus during the four months under review 247,457,000 pounds more were received from places outside of Malaya than in 1922. This, however, still leaves an increase of 149,783,000 pounds from Malaya itself to be accounted for.

Evasion of Restriction

There is no way of accounting for all the increases mentioned except by large-scale and successful evasions. Before restriction had been in force a month reports were heard of various manoeuvers for evading restriction. Hoarding and trading in coupons were most common.

Fortunately, the authorities have realized the gravity of the situation and are actively engaged in tracking down the offenders, who are treated with just rigor.

The amount of rubber shipped on forged coupons during the period November 1, 1922, to March 20, 1923, totaled 3,210.25 and replacements 828.75 piculs (a picul is equal to 133⅓ pounds) for the Federated Malay States. The coupons were mostly of 1 picul and of 25 kati denominations (100 katis equal 1 picul).

The Stevenson plan does not interfere with production, and planters can produce as much as they like. Most of the small holders and some large ones are tapping all they can. The rubber not covered by legitimate coupons is bought up and by means of smuggling, false or traded coupons, it is shipped out of the country. Trading in coupons has been rife from the beginning. At first it seemed that if a big concern bought up the coupons of a small holder (who therefore could not tap) no harm would result, so long as the exports represented 60 per cent of the production. However, it now appears that through misrepresentation of owners or through oversight of officials, thousands of acres of rubber land not now bearing have coupons which are sold. Certificates of standard production and coupons have been issued, it is claimed, to large estates that have been abandoned. Again, many estates which never have and never will be able to produce more than 200 pounds of rubber per acre, have permission to produce at the maximum laid down by the restriction law, rates which far exceed their highest yields.

Dissatisfaction with the Scheme

Small wonder, therefore, that restriction is being criticized on all sides. The authorities have recently issued new rulings dealing with unlicensed rubber. From April 30, 1923, no licensed dealer may have cultivated rubber in excess of the quantity for which he holds coupons or certificates. Every licensed dealer must, not later than May 1, 1923, furnish a return specifying the nature and quantity of unlicensed rubber on his premises. No licensed dealer may move from his premises, transfer or sell, any rubber included in a return without written permission from the licensing officer.

It is further intended by the Central Advisory Committee in Malaya to vary the system of assessment, which amounts to abandoning the Stevenson system of calculating standard productions on the 1919 and 1920 basis. Recommendations on this subject have been forwarded to the Ceylon Imperial Governments and, if regarded unfavorably, may result in the resignation of the Central Committee.

Malay Company Reports

The increased prosperity in the rubber planting industry is evident in the recently published company reports:

Selaba: Dividend 5 per cent, profit £14,605 against £564 in 1921.

Selangor: Dividend 16 2/3 per cent; £18,688 forward.

Sungei Way: Dividend 10 per cent; £3,320 forward.

Damansara: Dividend 5 per cent; profit £18,161.

Batu Caves: Dividend 4 per cent; profit £10,921.

Golden Hope: Dividend 5 per cent; profit £5,074.
Manchester, North Borneo: Dividend 5 per cent.
Seafield: Dividend 5 per cent; profit £27,857.
Harpenden: Dividend 3¾ per cent; profit £7,089.
Sungei Kruit: Dividend 10 per cent; profit £7,215.
Sungei Sayon: Profit £1,618.
Cheviot: Dividend 5 per cent; profit £15,305.
Labu: Dividend 7½ per cent; profit £19,540.
Gula-Kalumpong: Dividend 10 per cent; profits £72,821.

Sepang Selangor was registered on March 13, 1923, with a nominal capital of £350,000 in £1 shares to acquire certain estates and to cultivate and deal in rubber, coffee, tea, etc. Registered office: 1-4 Great Tower Street, London E. C. 3.

Lambak Rubber Limited was registered March 19, 1923, with nominal capital £200,000, in £1 shares to acquire estates planted with rubber or suitable for rubber. Registered office: 5, Whitington Avenue, London E. C. 3.

Latex Shipments

During March, 1923, 14,112 gallons of latex, valued at $24,794 were exported from Malaya, bringing the totals for the first three months of 1923 to 44,959 gallons, value $72,095.

Ceylon

When restriction was first introduced, Ceylon took the matter very quietly. When, immediately after, the market began to rise and kept on rising month after month, most local planters were staunch upholders of the scheme, and while it was subjected to a good deal of criticism in Malaya from the outset, very little was said against it here. However, during the last two months prices have undergone a set-back. Therefore, we have begun to reconsider our opinion of the blessings of restriction and are beginning to wonder instead whether the rubber industry would not have revived even without restriction and whether we would not have made a good deal more money if we had not been obliged to cut down our exports by 40 per cent.

Incidentally, statistics make one wonder whether there has been any restriction at all. From January 1 to April 8, 1923, Ceylon exported 27,824,792 pounds of rubber as compared with 27,330,777 pounds in the same period of last year.

To be sure, it is claimed that Ceylon had a good deal of accumulated stocks to get rid of, but still, some of us are wondering. There are those among us who have been allowed to export under restriction an amount of rubber never before produced and never expected possible to produce, for the standard of production allowed has been far too liberal in many cases. So we can sell rubber permits, which is a profitable business just now, yielding from 40 to 60 cents per pound of rubber licensed.

Many of us have claimed exemptions for all sorts of reasons and are now producing more than we were able to produce before restrictions made tapping profitable once more.

Of the small men, quite a few resort to forging of licenses; it is so easy to turn 11 into 111, for instance.

However, the powers that be are going to take a tip from Malaya and are talking of restricting the sale of licenses, of investigating estates, so that life will not be quite so pleasant for the frail ones among us. Our hopes of making easy money on hoarded rubber are also threatened, for it has been suggested that restriction be enforced for a stated number of years, three years for instance.

Netherlands East Indies

Preservation of Latex with Ammonia

In the April, 1923, issue of the *Archief voor de Rubbercultuur* Dr. O. de Vries treats of some important points concerning the preservation of latex. Tests were carried out to determine the smallest quantity of ammonia that can safely be used and it was found that well-closed bottles, kept in the laboratory, remained in perfect condition for half a year and even a year when 20 c.c ammonia, specific gravity 0.9327 had been added to a liter of latex. With 15 c.c., good results were obtained in 8 cases out of 9.

Fresh latex was found to be alkaline against methylred, which was used for titration. A decrease of 0.01 of the NH_3 content is noted when titrating with methylred.

For practical purposes ⅓ per cent to ½ per cent of ammonia is sufficient, corresponding to 20 c.c. of 18 per cent ammonia and 30 c.c. of 18 per cent ammonia, respectively. Latex thus treated will keep in good condition for months. The methylred titer in the first case is 0.16 normal for fresh ammoniated latex, and may decrease to 0.14 normal during the first few weeks. In the second case the titer is 0.25 normal and may decrease to 0.22 normal during the first few weeks.

The longer ammoniated latex is kept, the greater the decrease in alkalinity. Where small quantities of ammonia have been used, coagulation takes place within a few days; where the dose has been sufficiently large, the decrease in alkalinity takes place very slowly and alkalinity may even remain constant for some weeks.

Ammoniated latex shows other changes. After standing for one day, a precipitate is formed containing rubber and a fairly large proportion of compounds insoluble in boiling petroleum. When it is kept for a longer time, a small quantity of heavy, dark brown precipitate is formed, presumably iron sulphide. Kept still longer in bottles, a creamy layer of a porridge-like consistency forms on top. The rubber content of this creamy layer was found to be 56 and 62 per cent. This layer gives a lower titer than the liquid below.

Hydrogen sulphide was developed when old ammoniated latex was acidified. This gas is not liberated when ordinary latex is acidified, but develops when the coagulum is kept under water for several days. A decomposition by which sulphides are formed also seems to proceed in ammoniated latex.

Fresh, ammoniated latex coagulates slowly when acids are added, just as ordinary fresh latex does and is just as easy to handle as the latter. But ammoniated latex of one month and over has undergone such a change that immediate local coagulation takes place when acid is added, just as is noted when alcohol is added to fresh latex.

In the *Indische Mercuur* of May 4 appears an article by Dr. F. C. van Heurn on the possibilities of gutta percha. He points out that formerly gutta percha was used for several purposes where it has since been displaced by other materials partly owing to its high cost. This high cost in the past was chiefly due to the methods of collecting it, whereby the trees were destroyed and the natural sources were gradually diminished. However, the work of the Government in Java shows what can be done by extracting the gutta from the twigs and leaves. If others undertook to do the same—and in Sumatra some beginnings in this direction have been made—and the quantities of gutta percha increased while the price decreased, it might be found to be profitable to use gutta percha once more for some of the purposes for which it was found suitable in the past, or quite new uses might be found for it.

It might be used for water-piping in the tropics, especially in out-of-the-way places. Here, too, gutta percha boats, mentioned in *The Civil Engineer and Architect's Journal* of October, 1848, might be employed. Such boats require from 12.5 knots of gutta percha up and would be serviceable and cheap in the interior in tropical countries.

Shipments of Latex

The total exports of latex from Belawan-Deli during 1921 amounted to 51,975 kilos, which all went to America. During 1922, 515,486 kilos were shipped from January to December, 131,046 kilos in October, 109,737 kilos in November and 227,615 kilos in December, altogether 983,884 kilos. This was distributed as follows: 978,893 kilos to America, 623 kilos to Germany, 1,015 kilos to Singapore, 3,178 kilos to England and 175 kilos to the Netherlands.

Recent Patents Relating to Rubber

The United States

Issued* May 1, 1923

No. 1,453,348 Puncture-proof pneumatic tire. R. Grieve and J. W. Flading, Lansing, Mich.

1,453,351 Sectional tire casing. H. R. Haupt, St. Louis, Mo.

1,453,373. Shingle strip. H. Abraham, New York, N. Y., assignor to The Ruberoid Co., a corporation of New Jersey.

1,453,403 Resilient heel. J. A. Parrella, Washington, D. C.

1,453,459 Rubber heel. R. I. Hill, Elyria, Ohio, assignor, by mesne assignments, to W. R. Huntington.

1,453,460 Rubber heel. R. I. Hill, Elyria, Ohio, assignor, by mesne assignments, to W. R. Huntington.

1,453,480 Shipping container. W. E. Sanders, assignor to Essex Rubber Co.—both of Trenton, N. J.

1,453,485 Tube repair plug. J. R. Bosburgh, Johnstown, N. Y.

1,453,530 Armored tire. W. A. Shuey, Boise, Idaho.

1,453,614 Cushioned Vehicle Wheel. R. J. Balazs and H. S. Autrey, Cleveland, Ohio, assignors to Houston Pneumatic Puncture-Proof Wheel Co., Houston, Texas.

1,453,721 Tire valve. A. B. Norwalk, New York, N. Y., assignor of one-half to C. Hubert, White Plains, N. Y.

1,453,786 Pneumatic tire and wheel. G. A. Dufresne, Trois Rivieres, Quebec, Canada.

1,453,804 Armored tire. J. E. Mote, Dayton, Ohio.

1,453,823 Hose construction. C. M. Clay Baird, Chicago, Ill.

1,453,862 Hat protector. J. M. Check, Wilkes-Barre, Penn.

1,453,865 Method of constructing pneumatic tires. F. S. Dickinson, New York, N. Y., and J. Springer, Atlantic Highlands, N. J., assignors to said Dickinson.

1,453,884 Spiral spring tire filler. V. O. Mcutray, Muskogee, Okla.

1,453,949 Inner tube. H. C. Privett, Long Beach, Calif., assignor of one-half to C. R. Privett, Burbank, Calif., three-sixteenths to H. E. Privett, and one-sixteenth to H. F. Privett, both of Long Beach, Calif.

Issued* May 8, 1923

1,454,036 Resilient tire construction. S. C. Brown, Amite, La.

1,454,054 Antiskid device for tires. I. F. Kepler, Akron, Ohio, assignor to The B. F. Goodrich Co., New York, N. Y.

1,454,103 Solid cushion tire. V. M. Cabretesa, Barcelona, Spain.

1,454,388 Folding bucket or the like. L. W. Laurén, assignor of one-half to E. E. Ericsson—both of Rosta, Orebro, Sweden.

1,454,469 Pneumatic tire. F. S. Dickinson, New York, N. Y., and J. Springer, Atlantic Highlands, N. J.; said Springer assignor to said Dickinson.

1,454,641 Hairdressing device. L. Hicks, Omaha, Nebr.

1,454,645 Breathing apparatus. F. W. Koehler, assignor to American Atmos Corporation—both of Pittsburgh, Penn.

1,454,797 Tire rim. J. H. Taylor, Mellen, Wis.

1,454,829 Spring rim. T. H. Bell, New York, N. Y., and J. G. Schoenleber, Brooklyn, N. Y.

Issued* May 15, 1923

1,454,854 Pneumatic valve. H. P. Kraft, Ridgewood, N. J.

1,454,885 Rubber sole. G. Ferguson, Wollaston, Mass., assignor to United Shoe Machinery Corporation, Paterson, N. J.

1,454,907 Molded and vulcanized turn sole. J. H. Rigby, Salem, Mass., assignor to United Shoe Machinery Corporation, Paterson, N. J.

1,454,995 Collapsible tire core. H. A. Denmire, assignor of one-half to The General Tire & Rubber Co.—both of Akron, Ohio.

1,455,038 Inner tube. H. F. Bledsoe, Ellensburg, Wash.

1,455,080 Dust cap for tire valves. C. R. Creson and J. W. Kindelberger, Wheeling, W. Va.

1,455,140 Rubber footwear. T. E. La Fayette, A. A. Glidden and J. J. Gaughan, assignors to Hood Rubber Co.—all of Watertown, Mass.

1,455,146 Signal device for tire valves. A. Nelson, Wheaton, Minn.

1,455,291 Vibrator with rubber diaphragm. P. W. Hoffmann, New York, N. Y.

1,455,359 Vulcanized rubber and fabric hose. E. Schulthess, South Orange, N. J.

1,455,361 Solid elastic tire for road vehicles. J. F. Sipe, New York, N. Y.

1,455,412 Armored pneumatic tire. C. Scheuner, Chicago, Ill.

1,455,453 Cushion wheel. B. L. Smith, Syracuse, N. Y.

1,455,472 Stamp-inking pad with rubber sponge. W. Bell, Marengo, Iowa.

1,455,481 Split demountable rim. H. E. Geiver, Wessington, S. Dak.

1,455,535 Ventilated waterproof shoe. L. Lazzari, Greenville, N. J.

1,455,615 Armored tire. E. L. Hodge, Far Rockaway, N. Y.

1,455,684 Demountable rim. S. B. Varner, Granby, Mo.

1,455,730 Demountable rim and tire. O. L. Ingram, Walla Walla, Wash.

1,455,733 Demountable rim. J. G. Reed, Orwigsburg, Penn.

1,455,734 Inner tube for automobile tires. W. E. Roberts, Little Falls, N. J., assignor to Paramount Rubber Consolidated, Inc., Philadelphia, Penn.

*Under Rule No. 167 of the United States Patent Office, the issue closes weekly on Thursday, and the patents of that issue bear date as of the fourth Tuesday thereafter.

Issued* May 22, 1923

1,455,775 Leakproof inner tube. G. C. Berryman, Los Angeles, Calif.

1,455,855 Armored tire casing. H. F. Andrich, Detroit, Mich.

1,455,857 Sectional rim. A. Bennett, Chesapeake, Ohio, and J. H. Hatchett, Huntington, W. Va.

1,455,870 Bath sponge. G. Fierheller, Toronto, Ontario, Canada.

1,455,889 Automobile tube. J. Schwab, Winnipeg, Manitoba, Canada.

1,455,890 Tire gage. M. C. Schweinert, West Hoboken, N. J.

1,455,962 Leak detector for tubes. H. M. Matthews, Worton, Md.

1,456,062 Pneumatic tire. E. B. Killen, London, England.

1,456,075 Automatic puncture-closing device for tires. M. Resk, New York, N. Y.

1,456,078 Tube and tire patch. A. E. Stephenson, Dallas, Texas.

1,456,115 Patch for pneumatic tires. J. I. Berg, Berg, N. Dak.

1,456,163 Solid tire. H. B. Walton, Deer Park, Wash.

1,456,168 Pneumatic life raft. C. C. Witmer and B. Havens, assignors to "Airships Incorporated,"—all of Hammondsport, N. Y.

1,456,202 Cushion tire. T. E. Ware, assignor of one-sixth to J. K. Riffel, one-sixth to F. H. Dodge, one-sixth to J. W. Stewart and one-half to E. Ware—all of Little Rock, Ark.

1,456,207 Pneumatic-cushion seat. J. M. Adamski, Milwaukee, Wis.

1,456,245 Dust cap. E. B. Mang, Los Angeles, Calif.

1,456,444 Air valve for inner tubes. S. Helick, Millsboro, Penn.

Issued* May 29, 1923

1,456,567 Pneumatic tube with supplemental closed fluid container. M. Rebollar y Plancht, Habana, Cuba.

1,456,729 Tire tread protector. W. J. Fraser, Toronto, Ontario, Canada.

1,456,775 Cushion pneumatic tire. A. J. Hicks, St. Louis, Mo.

1,456,829 Inner tube protector. C. Ratelle, Los Angeles, Calif.

1,456,843 Insole for shoes. L. E. Clark, Des Moines, Iowa.

1,456,908 Pneumatic tire. W. E. Powers, Boston, Mass., and M. F. Hannigan, Watertown, Mass.

1,457,016 Demountable rim. W. L. Branstool, Chicago, Ill.

1,457,242 Traction shoe for wheels. F. P. Girodo, New York, N. Y.

1,457,259 Rubber-covered bumper. A. M. Malluk and J. U. Korce, New York, N. Y., assignors to International Patent Investment Corporation, New York, N. Y.

1,457,287 Single-tube bicycle tire. A. K. Trenholme, Portland, Oreg.

The Dominion of Canada

Granted April 17, 1923

230,359 Elastic hand shield. Guy Campbell, London, England.

230,386 Tire valve. J. Lumb, Elland, York, England.

230,435 Combined dust cap and valve cap. A. Schrader's Son, Inc., assignee of M. Schweinert—both of New York City, N. Y.

Granted April 24, 1923

230,545 Rubber heel. The Essex Rubber Co., assignee of W. E. Sanders —both of Trenton, N. J.

230,565 Air tube for pneumatic tires. The T. B. McLeroth (Tubes), Ltd., assignee of T. B. McLeroth—both of London, England.

Granted May 1, 1923

230,624 Pneumatic tire. R. B. Disbrow, Owatonna, Minn.

230,630 Tire tool. A. Gauthier, Montreal, Quebec, Canada.

230,744 Inner tube for pneumatic tires. The McLeroth Pneumatic Tire Syndicate Limited, assignee of Thomas Baker McLeroth—both of London, England.

Granted May 8, 1923

230,821 Cushion wheel. C. B. Evans, Chicago, Ill.

230,878 Rubber heel. J. G. Tufford, Elyria, Ohio.

230,900 Method of building tires. The Goodyear Tire and Rubber Co., assignee of K. B. Kilborn—both of Akron, Ohio.

230,901 Gas valve. The Goodyear Tire & Rubber Co., assignee of A. G. Maranville—both of Akron, Ohio.

230,941 Reinforcement for rubber overshoes. J. B. Norton and A. H. Hugill, assignee of one-half of the interest—both of Sault Ste. Marie, Ontario, Canada.

230,956 Air cushion. H. Kamrass, New York City, N. Y.

The United Kingdom

Published May 2, 1923

194,321 Rubber mud guard. E. Brunswick, 44, Rue du Faubourg du Temple, Paris, France.

194,345 Rubber pad for boot or shoe protector. A. A. Crozier, Cambridge Street Rubber Mills, Bradford Road, Manchester, England.

194,452 Solid or cushion tire. E. B. Killen, 27 Queen Victoria street, London, England.

194,485 Frameless glass held in rubber groove, for vehicle window. C. T. Weymann, 20 Rue de Troyon, Paris, France.

194,654 Rubber soles and heels, Société A. Ducos et Fils, 69 Rue Pasteur, Bordeaux-Gauderan, Gironde, France.

194,667 Inflatable rubber lay figure. H. Zilberstein, 205 Rue St. Honore, Paris, France.

Chemical Patents will be found on page 639, Machinery and Process Patents on pages 643-644

Published May 9, 1923

194,851 An end-fixing device for braided elastic cords. E. Robinson and A. P. Bateman, Royal Aircraft Establishment, South Farnborough, Hampshire, England.

194,920 Rubber mud guard. A. Miller, 10 Sutherland street, Aston, Birmingham, England.

194,940 Rubber mud guard. A. H. Gee, 36 Mountfield Road, and J. H. Bolton, 146 Northgate Road—both in Stockport, Cheshire, England.

194,981 Steel disk and guard with rubber head. F. Swaine, 4 Albany Terrace, Burnley, and D. Crankshaw, 21 Stanley street, Brierfield, near Burnley, England.

195,000 Fountain pen with rubber sac. H. Ross, 50 Pall Mall, London, England.

195,022 Rubber veneer disk wheel. H. N. Atwood, Monson, Mass.

Published May 16, 1923

195,145 Rubber treads for vehicles, gangways, etc. W. G. Martin and North British Rubber Co., Ltd., Castle Mills, Fountainbridge, Edinburgh, Scotland.

195,146 Rubber treads for staircases, steps, etc. W. G. Martin and North British Rubber Co., Ltd., Castle Mills, Fountainbridge, Edinburgh, Scotland.

195,221 Armored tire. E. C. R. Marks, 57 Lincoln's Inn Fields, London, England.

195,231 Inner tube for tires. F. L. Rapson, Ottershaw Park, Chertsey, Surrey, England.

195,234 Reinforcing armored strip for tires, tubes or hose. S. C. Caddy, 205, Richmond Road, Kingston-on-Thames, England.

Published May 24, 1923

195,454 Stapling tool for pole pads. A. A. Crozier, 75 Landsdowne Road, West Didsbury, Manchester, England.

195,514 Display card for heels. T. F. Atkinson and H. Atkinson, (trading as Atkinson Rubber Co.), Ace Works, Adderley street, Birmingham, England.

New Zealand

Published April 11, 1923

49,379 Rubber tire patch. A. H. Eden, 48 Manukau Road, Parnell, Auckland, New Zealand.

Germany

Design Patents Issued, With Dates of Issue

844,010 (March 6, 1923). Pocket inhaler. Dr. Justin Schwarzbart, Judenstrasse 22, Berlin.

844,121 (February 26, 1923). Elastic bands for garters, suspenders, etc. Max Schwahe, Froweinstrasse 17, Elberfeld.

844,317 (December 14, 1922). Injection syringe. Dr. Paul Leopold, Günthersburg—Allee 14, Frankfurt-am-Main.

844,412 (February 13, 1923). Nipple for children's feeding bottles. Hermann Wiedenhaupt, Zetzin, Kr. Dramburg, Post Wusterwitz.

844,518 (March 2, 1923). Waterproof boat. Georg Lachner, Immenstadt.

844,642 (March 29, 1923). Rubber-elastic bandage for varicose veins. Vereinigte Gummi-band—Webereien Tillmanns, Schniewind & Schmidt, Elberfeld.

844,764 (January 11, 1923). Tread for bicycle tires and the like. Carl Becker, Rölsdorf-bei-Düren, Rheinland.

844,835 (March 27, 1923). Ball-cushions. Dr. Karl Fischer, Gartenstrasse 17, Stuttgart.

844,899 (March 31, 1923). Syringe. Firma Paul Walb, Nürnberg.

844,946 (March 31, 1923). Protective covering for bottles, particularly children's feeding-bottles. Curt Winkler, Wächterstrasse 48, Dresden.

844,970 (February 21, 1923). Electrical insulating body. Fulguritwerke Seelze und Eichriede in Luthe bei Hannover, Adolf Oesterhold, Eichriede b. Wunstorf.

845,264 (February 8, 1923). Pneumatic tire. Fernando Barcena de Andres, Vigo, Spain; represented by: Dr. O. Arendt, Berlin W. 50.

845,530 (March 23, 1923). Atomizer for liquids. Weinlich & Co., Berlin.

Patents Issued, With Dates of Issue

376,964 (March 13, 1921). Inhaling apparatus. Fritz Ernst Curty, Zurich, Switzerland; represented by: E. Lamberts, Berlin, S. W. 61.

376,995 (July 6, 1922). Sports shoe. Bruno Koch, Meuselbach, Thüringer Wald.

377,086 (June 22, 1921). Caps for pneumatic tire valve. A. Schrader's Son, Inc., Brooklyn, New York; represented by: R. Heering, Berlin, S. W. 61.

377,538 (August 27, 1922). Irrigator can with double jacket. Max Becker and Christo Georgieff, Dresdenerstrasse 71, Berlin.

377,539 (April 24, 1921). Inhaler. Friedrich Doppler, Iggelheim, Pfalz.

377,617 (May 19, 1922). Pessary. Dr. Heinrich Fischer, Karlsbad, Zecho-Slovakia; represented by: Max F. Schmidt, Würtenberg—Allee 26-27, Charlottenburg.

Trade Marks

The United States

Two Kinds of Trade Marks Now Being Registered

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section 1 (b), are non-technical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registered under the latter act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation.

Granted May 1, 1923, Act of February 20, 1905

167,376 ANATINE—coal tar chemicals or intermediates, rubber accelerators or catalyzers, rubber compounding ingredients, and flotation agents. National Aniline & Chemical Co., Inc., New York, N. Y.

167,432 FEATHEREDGE, in script, the final E ending in a flourish which underscores the word—rubber sponges and rubber sponge for manufacturing purposes. Featheredge Rubber Co., Inc., Chicago, Ill.

167,444 The letter E at the center of a circle the circumference of which is described by four disconnected segments—fabric hose. William & Charles Beck, Inc., Lawrence, Mass.

167,445 SHUR LOC, the words arranged one above the other with heavy black line between, the letters of the first word being so graduated as to describe at the top the arc of a circle; the second word similarly curved at the bottom—repair patches for pneumatic tubes. Harry E. Conroy, doing business as Edco Manufacturing Co., Wilkes-Barre, Pa.

167,495 THE MARTINETTE, in script—dress shields, Anita Martin, New York, N. Y.

167,513 BELL CORD; the words being separated by the outline of a bell at the center of which is the letter B—pneumatic tires. Bell Cord Tire Co., Inc., New York, N. Y.

Granted May 8, 1923, Act of February 20, 1905

167,660 TOLANIDINE—coal tar chemicals or ingredients, rubber accelerators or catalyzers, rubber compounding ingredients, and flotation agents. National Aniline & Chemical Co., Inc., New York, N. Y.

167,685 RUT PROOF—tires wholly or partly of rubber. The Goodyear Tire & Rubber Co., Akron, Ohio.

167,687 Line drawing of a valve cap—rubber valve caps. The Dayton Rubber Manufacturing Co., Dayton, Ohio.

167,731 A silver colored coating applied to one side of a sheet of packing—high pressure sheet packing consisting essentially of asbestos, rubber, vulcanizing agents and filler. The Raybestos Co., Bridgeport, Conn.

167,742 Representation of a poinsettia, with the word POINSETTIA describing an arc of a circle on the left—elastic webbing. The Russell Manufacturing Co., Middletown, Conn.

167,749 Representation of a miniature of Martha Washington, with the name MARTHA WASHINGTON describing a semi-circle above it—elastic webbing. The Russell Manufacturing Co., Middletown, Conn.

167,813 RADION—rods, sheets, and tubes of hard rubber. American Hard Rubber Co., Hempstead and New York, N. Y.

167,868 Representation of two hands grasping and stretching a piece of fabric—single and double-faced rubber sheeting. The Holstein Rubber Co., Hartford, Conn.

Act of March 19, 1920, Section 1 (b)

167,952 RUBBERBILT—brushes for various uses. E. Clinton & Co., Inc., Philadelphia, Pa.

Granted May 15, 1923, Act of February 20, 1905

168,071 EASY TREAD—rubber heels. Lynch Heel Co., Chelsea, Mass.

168,092 LEVELET, in black letters—endless woven cord fabric for use in manufacture of tires and fabric belting. Stockton Commission Co., Inc., New York, N. Y.

168,118 Two circles, overlapping; one containing the familiar advertisement comprising a tire and a child yawning and holding a lighted candle, and the other containing the words: TO BE THE BEST CONCERN IN THE WORLD TO WORK FOR AND THE SQUAREST CONCERN IN EXISTENCE TO DO BUSINESS WITH. THE FISK IDEAL—rubber tires and tubes. The Fisk Rubber Co., Chicopee Falls, Mass.

168,121 HIPPO—rubber and oiled coats and jackets—Goodyear Rubber Co., San Francisco, Calif.

168,122 RHINO—rubber and oiled coats and jackets. Goodyear Rubber Co., San Francisco, Calif.

168,190 DOMINANT—rubber tires. Henderson Tire & Rubber Co., Columbus, Ohio, and Buffalo, N. Y.

168,192 SURE SHOT, the words enclosed in a square of broken outline—rubber hose reinforced with fabric. The B. F. Goodrich Co., New York, N. Y.

168,197 Within a diamond-shaped outline the word WIN-ALL; at the center a circle as of tubing surrounding the N-A—inner tubes. Solomon Hershenstein, doing business as S. H. Rubber Manufacturing Co., New York, N. Y.

168,228 JAQUES—catheters and various medical and surgical tubes. William Warne & Co., Ltd., London, England.

168,240 FLEXERMATIC—rubber tires. Overman Cushion Tire Co., Inc., New York, N. Y.

168,241 FLEXAMATIC—rubber tires. Overman Cushion Tire Co., Inc., New York, N. Y.

168,242 FLEXIMATIC—rubber tires. Overman Cushion Tire Co., Inc., New York, N. Y.

168,243 FLEXOMATIC—rubber tires. Overman Cushion Tire Co., Inc., New York, N. Y.

168,262 The firm name and address arranged in three lines, one above the other, and the whole enclosed in a border—rubber boots and shoes. La Crosse Rubber Mills Co., La Crosse, Wis., U. S. A.

Act of March 19, 1920, Section 1 (b)

168,307 TITE-EDGE—rubber soles and heels. Essex Rubber Co., Trenton, N. J.

Granted May 22, 1923, Act of February 20, 1905

168,316 MAGNA—rubber plates or pads to be attached to soles of boots and shoes. Phillips' Patents, Limited, London, Eng.

168,333 SANA-GENIC—baby pants and bibs, and waterproof aprons. The Mills Brothers Co., doing business as The American Products Co., Cincinnati, Ohio.

168,338 ARTCO—belts for personal wear and shoes and slippers of rubber, rubber and canvas, rubber and leather, and canvas and leather. The American Rubber & Tire Co., Akron, Ohio.

168,357 DURO-CORD—rubber tires and tubes. C. Kenyon Co., Inc., Brooklyn, N. Y.

Act of March 19, 1920, Section 1 (b)

168,491 BLENDED PINK; the letters slightly curved and arranged as if at opposite ends of the arc of a circle—rubber for use in making dental plates. E. J. McCormick Rubber Co., Lodi, N. J.

168,508 FOOT-GRIP, the letters in script on an upward slant and enclosed by double ruled border—arch supports and elastic bandages. Hochschild, Kohn & Co., Inc., Baltimore, Md.

168,520 SOUND—solid and pneumatic rubber and fabric tires. Western Rubber Co., Tacoma, Washington.

168,522 THE PRACTICAL RUG CORNER, arranged in lines of two words each, at the center of a figure suggestive of the capital letter A, the two sides of which are formed by the words in very small type: THIS RUBBER CORNER WILL PREVENT RUGS CURLING AND SLIPPING—corner attachments for rugs and the like to prevent slipping. Klearflax Linen Rug Co., Duluth, Minn.

Granted May 29, 1923, Act of February 20, 1905

168,544 OK; the letters separated by blank space, being within a square with triple ruled border having the corners rounded—patch for tires. O. K. Patch Co., Belleville, Texas.

168,653 PAXIT—asbestos rubber sheet packing. Walworth Manufacturing Co., Boston, Mass.

168,708 Representation of an oblong piece of paper having a "crack finish" appearance, produced by irregular horizontal lines crossed at irregular intervals by short wavy lines, upon a background of different color—erasers, rubber bands, lead pencils, refills, etc. American Lead Pencil Co., New York, N. Y.

168,729 Representation of a tropical scene with a lion couchant against a background of palm trees, the frame of the picture being in the form of a circular belt with buckle at one side and overlapping ends opposite; the word LION on the belt at upper left—hot water bottles, rubber gloves, rubber sheets, sanitary articles of apparel, and thermometers. Calhoun, Robbins & Co., New York, N. Y.

168,790 HUNT FOR TIRES, in very large display type arranged in three lines, one above another—pneumatic and solid tires of rubber, fabric, and leather, and combinations of same; inner tubes; patches; tire covers, and tire reliners. Albert L. Hunt, Peoria, Ill.

168,796 Representation of a Greek cross, with Gasmask, as one word, extending from arm to arm across and from top to bottom, so that the central M is common to both—hospital sundries, namely, hot water bottles, ice caps, rubber gloves, etc. Henry L. Kaufmann, Boston, Mass.

168,808 VUL KO CENE, in large type with THE ACCELERATOR in small type below—chemical composition to assist in the vulcanizing of rubber. The Vul Ko Cene Co., Kent, Ohio.

168,819 ALADDIN, and to the right of the word a representation of a tiny Aladdin's lamp enclosed in a double ruled circle—tire casings and inner tubes. Aladdin Tire Corp., Rutherford, N. J.

168,863 Description same as for 168,729—erasers, rubber bands and stationery sundries. Calhoun, Robbins & Co., New York, N. Y.

168,904 HICKORY—dress shields. A. Stein & Co., Chicago, Ill.

168,922 Within a double circle composed of one heavy and one light line, two ivy leaves one at top and one at bottom, bearing the word IVY, while variously disposed within the circle, on what is supposed to be lengths of webbing, are the inscriptions: IN., 12 YARDS; EXTRA SUPER LISLE, and beneath all the word TRADEMARK, in very small type—elastic webs. George S. Colton Elastic Web Co., Easthampton, Mass.

Act of March 19, 1920, Section 1 (b)

168,995 HYDRO-PROOF, curved to describe a semi-circle—insulating tape. Elkhart Rubber Works, Elkhart, Ind.

169,016 Within a double ruled circle the firm name and address, following the curve of the circle; at the center of the circle the words: EVERYTHING FOR THE LADIES AND BABIES—rubber goods, namely aprons, infants' pants, bibs, children's coveralls, household rubber gloves, etc., R. B. Hansen Rubber Co., Akron, Ohio.

169,031 A panel bearing the firm name—automobile tires. Central Automobile Tire Co., Boston, Mass.

The Dominion of Canada

Registered

33,100 Representation of an eagle with wings extended resting on a grate, behind the eagle outlines of the sun are seen, and below the grate a bunch of laurel. On one side of the eagle are the initials H. R. and on the other side & CO.—rubber tissue intended as an adhesive, reinforcement, stiffening waterproofing medium in the manufacture of garments and other textile goods. Edward P. Stahel & Co., New York, N. Y.

33,111 SAMSON—pneumatic tires, tubes and casings, blow-out shoes, patches, liners, belts and belting, automobile covers, gaskets and valves, shoe soles and weather stripping. Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont.

33,122 ZEROVER—footwear and particularly rubber footwear. Ames Holden McCready, Ltd., Montreal, Quebec.

33,123 ZER' ARCTIC—footwear, particularly of rubber. Ames Holden McCready Limited, Montreal, Que.

33,131 Panel in which is displayed the word or phrase U WEAR—rubber boots and shoes. Goodyear Rubber Co., Middletown, Conn., U. S. A.

33,139 RUBBABUBBLES—combined toys and sweetmeats. George Ingram, London, Eng.

33,150 Representation of a cluster of balloons, three of which prominently display the letters O A K—toy balloons and bladders, with or without valves or other attachments. The Oak Rubber Co., Ravenna, Ohio, U. S. A.

33,165 SULZIN—chemical substances used in manufactures, photography, or philosophical research, particularly a chemical substance for the vulcanization of rubber, and anti-corrosives. Tom Hartley Roberts, Reigate, Surrey, Eng.

33,216 ACE, disposed transversely of the representation of an ace of spades—combs. American Hard Rubber Co., New York, N. Y., U. S. A.

33,244 Silver colored coating on one face of packing—high pressure sheet packing. The Raybestos Co., Bridgeport, Conn., U. S. A.

33,245 Silver colored coating on the edges of the lining—brake lining. The Raybestos Co., Pridgeport, Conn., U. S. A.

33,246 Gold colored coating on the edges of the lining—brake lining. The Raybestos Co., Bridgeport, Conn., U. S. A.

33,247 Gold colored coating on the edges of the lining and the word, ROYAL—brake lining. The Raybestos Co., Bridgeport, Conn., U. S. A.

New Zealand

Published April 5, 1923

18,188 Representation of a winged arrow against a circular background with shaded center, on the double-ruled border of which appear the words: TRADEMARK, above, and WOOD-MILNE in larger type below—india rubber tires and inner tubes; rubber soles, heels, tops and pads for boots and shoes. Wood-Milne, Ltd., and George Spencer Moulton & Co., Ltd., 2 Central Buildings, Westminster, London, England.

The United Kingdom

Published May 2, 1923

431,511 WIN-WAY—boots and shoes with rubber and leather soles. Joseph Herbert Fish, Crumpsall, Manchester.

431,512 KODACREPE—rubber heels, quarter heels and soles. Joseph Herbert Fish, Crumpsall, Manchester.

431,549 BULLDOG—footballs. Barrow, Hepburn & Gale, Ltd., 47 Weston Street, London, E. E. 1.

433,264 CORDATIC—all goods included in Class 40. Magyar Ruggyantaarugyar Veszvenytarsasag, a joint-stock company organized under the laws of Hungary, 17 Kerepesint, Budapest, Hungary. For service in the United Kingdom, address in care of W. P. Thompson & Co., 12 Church St., Liverpool.

435,054 DEU-TY—rubber heels for boots and shoes. Ernest Albert Aldam, 110 Bispham road, Southport, Lancashire.

435,295 EXPRESS—goods manufactured of india rubber and gutta percha, not included in classes other than Class 40, but not including rubber tips and pads for heels of boots and shoes and not including goods similar to such tips and pads. The Leyland & Birmingham Rubber Co., Ltd., 24-30 Duke Street, Aldgate, London, E. C. 3.

Published May 9, 1923

B433,848 SARTOR—rainproof clothing. Bernard Cohen, trading as Sartor Manufacturing Co., The Sartor House, Derby street, Cheetham, Manchester.

434,111 Representation of two elephants grasping with their trunks the end of a coil which lies between them, and pulling against each other; this representation separating the words HATHI and CHAP—Solid rubber tiring for carriages, made in Great Britain for export to India. Haroon Hamid, trading as H. Hamid & Co., Napier Road, Karachi, India.

435,470 FLEXO—rubber, gutta percha, or balata machine belting. Thomas & Bishop, Ltd., 37 Tabernacle street, London, E. C. 2.

435,576 KING DICK—footballs. J. & A. Hillman, Ltd., Castle Leather Works, Trindle Road, Dudley, Worcestershire.

Published May 16, 1923

430,652 DURABIT—electric insulating tapes made of textile material impregnated with rubber. Kaupy & Schonmann Kabel-Isolierband und Gummiwarenfabrik, Zollergasse 5, Vienna VII, Austria. For service in the United Kingdom, address in care of Marks & Clerk, 57 and 58 Lincoln's Inn Fields, London, W. C. 2.

432,199 SAFEPLEX—a hand tool for cutting the bark of trees. Eric John Koch (rubber planter), Sungei Timah estate, Teluk Anson, Perak, Federated Malay States. For service in the United Kingdom, address in care of Haseltine, Lake, & Co., 28 Southampton Puildings, London, W. C. 2.

432,966 LAYTAX—paper, except paper hangings, containing latex. Wiggins, Teape & Co. (1919), Ltd., 10 Aldgate, London, E. 1.

434,311 Representation of a sailing vessel fully rigged; under this the word ATLANTIC in large display type, and under this the words RUBBER COMPANY, LIMITED, the last word underscored —instruments, apparatus, and contrivances, not medicated, for surgical or curative purposes. Atlantic Rubber Co., Ltd., 167 Moorgate, London, E. C. 2.

434,314 Description same as for 434,311—goods of rubber and gutta percha included only in Class 40. Atlantic Rubber Co., Ltd., 167 Moorgate, London, E. C. 2.

434,315 Same description as for 434,311—toys made of rubber sponge. Atlantic Rubber Co., Ltd., 167 Moorgate, London, E. C. 2.

435,227 TREBEISA—toy balloons. Anthony Siebert, 6 Fann street, London, E. C. 1.

435,778 GARBONITE—goods of rubber or gutta percha exclusively in Class 40. Henry Gare, 1 High Road, Willesden Green, London, N. W. 10.

Published May 23, 1923

434,239 OLETO, the initial O being a large black circle in which the other letters are enclosed one above another—India rubber tires. The Norwalk Tire & Rubber Co., Norwalk, Connecticut, U. S. A. For service in the United Kingdom, address in care of F. W. Golby, 3 John street, Bedford Row, London, W. C. 1.

434,463 BRAMCOMEND—prepared rubber sheeting for pneumatic tire repair, and other rubber goods. Pramco (1920), Ltd., 99 St. Nicholas street, Coventry.

Prints

The United States

Registered May 22, 1923

6,712 VENUS ERASERS—for erasers. American Lead Co., New York, N. Y.

6,720 KIDDYGRIP SOCKETS—hosiery supporters. Isidor Goldberg, doing business as National Garter Co., New York, N. Y.

Labels

The United States

Registered May 1, 1923

25,881 COMET—golf balls. Jordan Marsh Co., Boston, Mass.

Designs

The United States

Issued* May 1, 1923

62,292 Tire tread. Term 14 years. Harold D. Mitchell, assignor to C. Kenyon Co., both of Brooklyn, N. Y.

Issued* May 8, 1923

62,321 Shoe heel. Term 7 years. Frank G. Delbon, Brooklyn, N. Y.

62,341 Heel pad for a boot or shoe. Term 14 years. Walter William Phillips, London, Eng.

62,342 Heel pad for boot or shoe. Term 14 years. Walter William Phillips, London, Eng.

Issued* May 22, 1923

62,394 Tire tread. Term 14 years. Frank W. Daniel, Wissinoming, assignor to Quaker City Rubber Co., Philadelphia, both of Pennsylvania.

62,395 Tire. Term 7 years. Frank Disch, Rutherford, N. J., assignor to Baker, Murray & Imbrie, Inc., New York, N. Y.

62,412 Tire tread. Term 14 years. Harold D. Reichard, Akron, Ohio.

62,292 62,394 62,395 62,412 62,413 62,422 62,423

62,413 Tire tread. Term 14 years. Harold D. Reichard, Akron, Ohio.

62,422 Tire. Term 14 years. Alfred K. Simmons, assignor of 35/100ths to Gus N. Boosalis and 15/100ths to Lucius A. Smith, all of Faribault, Minn.

62,423 Tire. Term 14 years. Alfred K. Simmons assignor of 35/100 to Gus N. Boosalis and 15/100 to Lucius A. Smith, all of Faribault, Minn.

*Under Rule No. 167 of the United States Patent Office, the issue closes weekly on Thursday, and the patents of that issue bear date as of the fourth Tuesday thereafter.

DISCARDED TIRES AS SMUDGE POTS

Worn out tires are now used in California vineyards to serve the same purpose as smudge pots in orange groves. When there is danger of frost the citrus growers light up the crude oil burners and thus easily keep the temperature near the trees from dropping below 32 degrees F. But an up-to-date smudge pot equipment is expensive, and many small growers are forced to do without such heaters. They may now, however, utilize a cheap and novel idea that has been tried with success by one grape raiser. As a rule, grape growers have given little or no attention to frost, depending upon late pruning to delay the new spring growth until all danger to the vines from frost is safely past. But in the San Joaquin Valley and some other sections during the past winter, growers of Thompson and other

Burning Tires to Prevent Frost Damage

early grapes have suffered so much loss that many of them, determined to take no more chances on frost damage, will install some form of heaters.

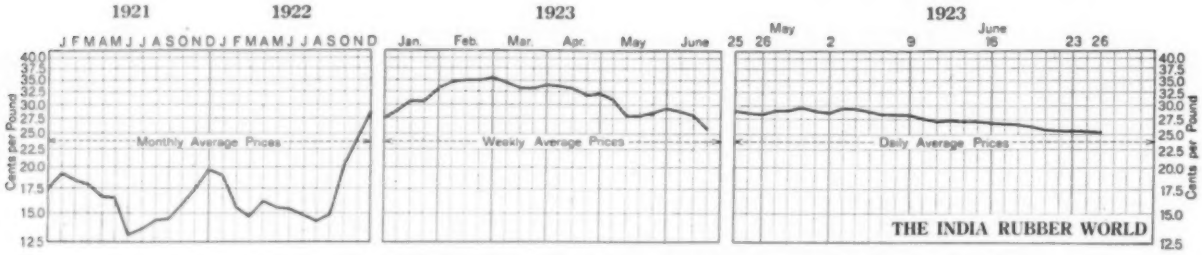
For his emergency heating outfit, the grape raiser referred to buys tires from a junk dealer at about $30 a ton and saturates the inner sides with oil. The tires are distributed in piles of three or four through the vineyard or orchard and when ignited yield quite enough heat not only to ward off frost but also to save the grower the trouble and expense of a second pruning which he has often been obliged to give frost-nipped vines.

NEW CABLE TO CROSS THE ATLANTIC

The Postal Telegraph Commercial Cables System has completed contracts for laying a new cable in the Atlantic Ocean between New York and London. The Telegraph Construction & Maintenance Co. and Siemens Brothers are engaged on the construction of the cable and it is expected that it will be laid by August 1. The route will be from New York to Nova Scotia, a distance of about 1,000 miles, and from there to the Azores, about 1,750 miles; there it will connect with a cable already laid to Waterville, Ireland, which will in turn connect with a new cable to be laid this summer from Ireland to England.

This is the first cable to be laid between America and Europe since 1910 and will be the fastest the world has yet known, with a speed of 600 letters per minute in both directions simultaneously, or a total of 1,200 letters per minute. An expenditure of from $10,000,000 to $15,000,000 is involved. It is stated that still another cable will be laid from the Azores to Europe in the near future.

DURING THE CALENDAR YEAR 1922 MEXICO OUTSTRIPPED OTHER countries of the world in her purchases of our waterproofed clothing, the value being estimated at $73,685. Other leading customers were Cuba, at $67,251; Quebec and Ontario, at $31,651; Newfoundland and Labrador, at $30,717; and the Philippines, at $21,714.



Ratio Graph of New York Market Fluctuations—Average Prices of Spot Ribbed Smoked Sheets

Review of the Crude Rubber Market

New York

NEW YORK spot price of ribbed smoked sheets took a turn upward from the low of around 28 cents which ruled about the middle of May, reaching practically 30 cents on May 30. From that date the price has declined in the prolonged absence of buying interest and by June 25 had lost all of the May rise and was around 26 cents.

The May advance followed closely on that in London, with interest centering on future positions in the last half of the year. The decline, which began with the opening of June, was also a movement in sympathy with London conditions where the recession of price was caused by the collapse of speculative operations.

The second week of June was dull and weak; some buying interest was shown by dealers but very little on the part of rubber manufacturers generally.

Tire dealers being well supplied with stocks, tire manufacturers are experiencing their usual summer seasonal decline in tire demand and have curtailed production accordingly. Their need to replenish stocks of crude rubber will therefore not be urgent for some weeks.

The third week of June was quieter than the second and very little business was done.

In the absence of demand, quiet conditions ruled for the remainder of the month with spot ribs at 24¾ cents on June 28.

Parás and all other grades ruled in sympathy with plantations, with very little buying interest.

Imports of all grades during May, 1923, were 36,184 tons, compared with 20,622 tons one year ago. Plantation arrivals for May, 1923, were 34,609 tons, compared with 19,485 tons one year ago. Total importations of all grades for five months ended May 31 were 157,105 tons, compared with 114,608 tons for the corresponding period of last year.

Spot and future quotations on standard plantation and Brazilian grades were as follows:

PLANTATIONS June 1. Spot first latex crêpe, 29¼ cents; June, 29¼ cents; July-Sept., 29⅜-29⅝ cents; July-Dec., 29¾-30 cents; Oct.-Dec., 29⅞-30¼ cents. June 25. Spot first latex crêpe, 26 cents; June, 26⅛ cents; July-Sept., 26¼ cents; July-Dec., 26¾ cents; Oct.-Dec., 25⅝ cents.

June 1. Spot ribbed smoked sheets, 29¼ cents; June, 29¼ cents; July-Sept., 29⅜-29⅝ cents; July-Dec., 29¾-30 cents; Oct.-Dec., 29⅞-30¼ cents. June 25. Spot ribbed smoked sheets, 26 cents; June, 26⅛ cents; July-Sept., 26¼ cents; July-Dec., 26¾ cents; Oct.-Dec., 27⅝ cents.

June 1. Spot No. 1 amber crepe, 28½-29 cents; June, 28½ cents; July-Sept., 29-29¼ cents; July-Dec., 29¼-29⅜ cents. June 25. Spot No. 1 amber crepe, 25⅛ cents; June, 25⅛ cents; July-Sept., 25 cents; July-Dec., 25⅝ cents.

June 1. Spot No. 1 rolled brown crepe, 26¼-26½ cents; June, 26½ cents; July-Sept., 27-27½ cents; July-Dec., 27¼-27⅜ cents. June 25. Spot No. 1 rolled brown crêpe, 24 cents; June, 24¼ cents; July-Sept., 24⅝ cents; July-Dec., 24¾ cents.

SOUTH AMERICAN PARAS AND CAUCHO, June 1. Spot, upriver fine, 28½-28¾ cents; islands fine, 26¾-27 cents; upriver coarse, 24½-24¾ cents; Cametá, 13½-13¾ cents; caucho ball, 25½-25¾ cents. June 25. Spot, upriver fine, 27 cents; islands fine, 25½ cents; upriver coarse, 23¾ cents; islands coarse, 13¼ cents; Cametá, 13½ cents; caucho ball, 24½-25 cents.

London

The London market was active the first of June, when spot ribbed smoked sheets sold for 15 pence. A setback was shortly experienced, the price declining to 14¾ pence, recovering later to 15⅛ pence, from which price the market has been dull, steadily declining to 13½ pence June 27.

Reported London spot stocks have shown a steady decline for the first three weeks of the month as follows: June 5, 53,627 tons; June 12, 52,453 tons, and June 19, 51,504 tons.

The decline of prices in London paralleled that in New York and virtually controlled them, since in both Great Britain and America there has been a lack of buying interest on the part of consumers.

New York Quotations

Following are the New York spot quotations per pound, for one year, one month ago, and June 25, the current date:

Plantation Hevea

	June 26, 1922	May 25, 1923	June 25, 1923
LATEX			
Rubber latex (Hevea)....	@	*gal.* $1.25@$1.35	*gal.* $1.25@$1.30
CREPE			
First latex	.15¼@.15⅜	.29 @	.26 @
Off latex	.15 @	.28¾@	.25¾@
Amber No. 1.....	.15 @	.28½@	.25⅝@
Amber No. 2.....	.14½@	.28 @	.24⅞@
Amber No. 3.....	.14 @	.27½@	.24⅝@
Brown, clean, thin.....	.14¼@	.27½@.27¾	.24½@
Brown, specky	.13¾@	.27½@	.24¼@
Brown, rolled	.11½@	.26½@	.24 @

Crude Rubber Market—*Continued*

	June 26, 1922	May 25, 1923	June 25, 1923
SHEET			
Smoked, ribbed	.15¼@.15⅜	.29 @	.26 @
Smoked, plain	†.14¾@	.27⅝@	.25½@
Unsmoked	†.14 @	.27 @	.25 @
SCRAP			
Colombo scrap No. 1	.12 @	@	@
Colombo scrap No. 2	.10½@	@	@
East Indian			
PONTIANAK			
Banjermassin	.07½@	.08 @	.07 @.08
Palembang	.08 @	.08½@.08¾	.08 @.10
Pressed block	.12½@	.13¼@.13½	.12 @.13
Sarawak	.06½@	.07 @.07½	.07 @.09
South American			
PARAS			
Upriver fine	.18 @	.28 @	.27 @.27¼
Upriver, fine	*.27½@	*.38¾@	*.38½@
Upriver, medium	.17 @	.25½@	.24 @
Upriver, coarse	.12¾@	.25 @	.23¾@.24
Upriver, coarse	@	*.36 @	*.37 @
Upriver, weak, fine	.15 @.15½	.25½@	.24 @
Islands fine	.16¾@	.26 @	.25 @.25½
Islands medium	.15 @.16	.24¼@	.23½@
Islands coarse	.08 @	.14¾@	.14 @
Cametá	.09½@	.15 @	.14 @
Acre Bolivian fine	.18½@	.27½@	.27 @
Acre Bolivian, fine	@	*.39 @	*.39 @
Beni Bolivian	.27½@	.27½@	.27½@.28
Madeira fine	.19 @.19¾	.27½@	.27 @
Peruvian fine	.16½@.17	†.26 @	.25½@.26
Tapajos fine	.17 @	.26 @	.26 @
CAUCHO			
Upper caucho ball	.12¾@	.26½@	.25 @
Upper caucho ball	*.18½@	*.37 @	*.38 @
Lower caucho ball	.10½@	.25¾@	.24 @
Maniçobas			
Ceará negro heads	†.10 @	.22 @	.22 @
Ceará scrap	†.05 @	.09 @	.09 @
Maniçoba 30% guaranty	†.08 @	.23 @	.21 @
Mangabeira, thin sheet	†.12 @	.24 @	.22 @
Centrals			
Central scrap	.08 @.69	.21¾@.22	.17½@.18
Central wet sheet	.04 @.06	.17 @.19	.12 @.14
Corinto scrap	.08 @.09	.21¾@.22	.17½@.18
Esmeralda sausage	.08 @.09	.21¾@.22	.17½@.18
Guayule wsh'd & dried	.26 @	.28 @	.28 @
Africans			
Benguela, No. 1, 28½%.	@	@	.18 @
Benguela, No. 2, 32½%.	†.07 @.07½	.14 @.15	.15 @
Congo prime, black upper	†.14 @.15	.24 @.25	.23 @
Congo prime, red upper	†.12 @	.21 @.23	.22 @
Kassai, black	@	.23 @.24	.23 @
red	†.10½@.12	.20 @.21	.22 @
Gutta Percha			
Gutta Siak	.15 @	.19 @.19¾	.16 @.18
Red Macassar	2.85 @3.00	2.90 @3.00	3.00 @3.05
Balata			
Block, Ciudad Bolivar	.51 @	.72 @.74	.63 @.66
Colombia	.42 @.45	.58 @.60	.52 @.54
Panama	.43 @	.58 @.60	.50 @.52
Surinam, sheet	.68 @	.80 @.83	.80 @.84
amber	.74 @.76	.83 @.85	.76 @.78
Chicle			
Colombia	.50 @	.25 @	.25 @
Honduras	.70 @	.62 @	.62 @
Venezuela	.72 @	.63 @	.63 @
Yucatan fine	.75 @.80	.65 @	.65 @

*Washed and dried crêpe. Shipment from Brazil.
†Nominal.

Comparative Low and High New York Spot Rubber Prices

	June 1923*	June 1922	June 1921
PLANTATIONS			
First latex crêpe	$0.25½@$0.29½	$0.14⅝@$0.15¼	$0.14 @$0.17½
Smoked sheet, ribbed	.25½@ .29½	.14⅜@ .15¼	.12 @ .14¾
PARAS			
Upriver, fine	.26¼@ .29	.18 @ .18	.15½@ .18
Upriver, coarse	.23⅝@ .25	.12¼@ .13	.07 @ .09¼
Islands, fine	.25¼@ .27¼	.16⅞@ .17½	.16 @ .18
Islands, coarse	.16 @ .17	.07¾@ .13	.07 @ .09
Cametá	.13¼@ .14½	.08 @ .09½	.07½@ .09

*Figured to June 25, 1923.

Amsterdam Rubber Market

JOOSTEN & JANSSEN, Amsterdam, report under date of June 8, 1923:

Fluctuations this week have been narrow and the turnover has been very unimportant.

The close is quiet, at about 1 cent below last week, as follows:

Hevea crêpe and sheets Fl. $0.79½	Spot.
Hevea crêpe and sheets Fl. .82	July to September.
Hevea crêpe and sheets Fl. .84	October to December.
Hevea crêpe and sheets Fl. .86	January to March.

Reclaimed Rubber

Conditions continue much the same as a month ago. In sympathy with the low prices for crude rubber and the general seasonal dullness of the markets for commodities, reclaims are not active, prices are low with actual values relatively high. Low gravity stocks high in carbon black content are particularly profitable at present prices from the compounders' standpoint because of their low volume cost and high tensile value.

New York Quotations

June 25, 1923

Prices subject to change without notice

Reclaimed Stocks

		Per Pound
FRICTION		
Compounded	lb.	$0.18 @$0.19
Pure gum friction	lb.	.21 @ .22
TUBE		
Compounded	lb.	.12½@ .12¾
Floating	lb.	.15 @ .15½
AUTO TIRE		
Black	lb.	.09¼@ .09¾
Gray	lb.	.10¾@ .11¼
White	lb.	.13¼@ .13½
Black, washed	lb.	.11 @ .11¼
SHOE		
Unwashed	lb.	.10½@ .11
Washed	lb.	.13¼@ .13½
MECHANICAL	lb.	.10 @ .11
TRUCK TIRE	lb.	.08½@ .09

New York Average Spot Rubber Prices

PRICES IN CENTS PER POUND

	May, 1923															June, 1923							
	14	15	16	17	18	19	21	22	23	24	25	26	28	29	30*	31	1	2	4	5	6	7	8	9
PLANTATIONS:																								
Sheet																								
Ribbed smoked	27⅛	26⅞	27¼	27⅝	28⅛	29	28⅝	28⅛	27⅝	28¼	28¾	28½	28⅜	28⅞	....	29¾	28⅞	28½	29¼	28¾	28¼	28⅛	28¼	28
Crêpe																								
First latex	27¼	26⅞	27⅜	27¾	28⅜	29	28⅝	28¼	27⅞	28⅜	29	28⅝	28⅝	29⅛	....	29⅞	29¼	28⅝	29⅛	28⅞	28¼	28¼	28¼	28⅛
Off latex	26⅜	26½	26⅞	27⅛	27¾	28⅜	28	27⅝	27¼	27¾	28¼	28	27⅞	28⅜	....	29	28½	28	28½	28⅜	27⅝	27½	27½	27½
No. 1 blanket	26⅛	26	26¼	26⅝	27¼	27⅛	27⅛	27⅜	27	27⅜	28⅛	27⅞	27⅞	28¼	....	29⅛	28½	28⅛	28½	28¾	27¾	27½	27⅝	27⅝
No. 2 blanket	25⅝	25½	25¾	26	26⅞	26⅝	26⅝	26⅞	26⅝	26⅞	27⅜	27⅜	27⅜	27¾	....	28¾	28⅛	27⅝	28	27⅝	27⅛	27	27	27
No. 3 blanket	25¼	25	25⅛	25½	26¼	26⅛	26⅛	26⅜	26	26⅜	27⅛	26⅞	26⅞	27⅛	....	27⅞	27½	27⅛	27⅜	27¼	26⅝	26⅝	26⅝	26½
Thin, clean, brown	25⅝	25⅛	25⅜	25⅝	26⅛	26⅝	26¼	26¾	26¼	27⅞	27	27	27¼	27¾	....	28¼	27½	27½	27¾	27⅝	27	27⅛	27	27
Specky brown	25	24¾	24⅞	25	25⅝	26	25¾	26¼	25⅝	26	26¼	26⅛	26	26¼	....	27½	26⅞	26¾	27⅛	26¾	26⅜	26½	26¼	26¼
Rolled brown	24⅜	24⅛	24½	24⅝	25½	25½	26	26	25⅝	26⅜	26¼	26⅛	26⅛	26⅛	....	26⅞	26¼	26¼	26⅜	26¼	25⅞	25⅞	25¾	25¾

* Holiday.

The Market for Rubber Scrap

New York

The market for rubber scrap during the past month has shown very little activity. The reclaimers have not been in the market for many weeks. Prices show little change and there has been very little movement of stock in any grade. Such business as has been done was practically confined to shipments on old contracts. All new business was small in volume and at very low rates.

The outlook in general is constructive, due to the fact that reclaimed rubber has been re-established firmly during the past year as a positive aid to compounding and production by reason of its value as a plasticator and its low volume cost.

BOOTS AND SHOES. The tendency to lower prices has been continuous for the past two months, at least. Dealers' bids for delivery on old contracts did not exceed $2.75 per hundred.

HOSE. The market is dull and prices nominal. Demand has ceased for the time being.

TIRES. Mixed tires are bid at $13 to $14 per ton without resulting business. There is no call for solids.

INNER TUBES. There have been a few orders executed for inner tubes. All the movement has been slow. Dealers' bids were about as follows: Mixed tubes, $2.25-$2.50; No. 1, $3.50-$4.25; No. 2, $3.00.

MECHANICALS. No market.

Quotations for Carload Lots Delivered

June 25, 1923

Prices subject to change without notice

Boots and Shoes		
Boots and shoes, black	lb.	$0.02¼ @ $0.03
Trimmed arctics	lb.	.02 @ .02¼
Untrimmed arctics	lb.	.01½ @ .01¾
Hard Rubber		
Battery jars, black compound	lb.	.02 @ .02½
No. 1 scrap	lb.	.09 @ .10
Inner Tubes		
No. 1	lb.	.04½ @ .05
Compound red	lb.	.03¼ @ .03½
Mechanicals		
Black scrap, mixed	lb.	.01⅛ @
Heels	lb.	.00½ @ .00⅞
Horse-shoe pads	lb.	.02¾ @ .03⅜
Hose, air brake	lb.	.00¾ @ .01
regular	lb.	.00½ @ .00¾
Red, scrap, mixed	lb.	.01¾ @ .02⅛
White scrap, mixed	lb.	.01¾ @ .02⅛
Tires		
PNEUMATIC		
Auto peelings	lb.	.01½ @ .01⅞
Bicycle	lb.	.00⅞ @
Standard white auto	lb.	.01¾ @ .01⅞
Mixed auto	lb.	.00⅞ @
Stripped, unguaranteed	lb.	.00½ @ .00⅝
SOLID		
Carriage	lb.	.01¼ @ .01½
Irony	lb.	.00¾ @ .00¾
Truck, clean	lb.	.01¼ @ .01½

QUEBEC AND ONTARIO CONTINUE IN 1923, AS IN THE YEAR PREvious, to be the leading importers of our miscellaneous rubber goods, the values for the first four months of the present year being as follows: January, $69,441; February, $67,878; March, $108,560; and April, $101,266. During 1922 the leading countries taking these products and the total values for the entire year are represented by: Quebec and Ontario, $815,288; England, $550,079; Mexico, $148,942; Cuba, $101,787; Japan, $82,931; and Argentina, $81,619.

United Kingdom Rubber Statistics

Imports

	April, 1922		April, 1923	
	Pounds	Value	Pounds	Value
UNMANUFACTURED				
Crude rubber				
From—				
Straits Settlements	1,644,600	£63,949	5,293,400	£345,266
Federated Malay States	5,788,400	265,001	2,751,200	180,883
British India	609,500	26,219	618,600	40,071
Ceylon and Dependencies	1,391,300	56,037	1,581,600	104,369
Other Dutch Possessions in Indian Seas	445,000	19,717	146,200	10,355
Dutch East Indies (except Other Dutch Possessions in Indian Seas)	1,015,500	43,843	932,000	59,676
Other countries in East Indies and Pacific, not elsewhere specified	361,300	13,695	103,300	7,282
Brazil	813,000	36,870	157,900	9,692
South and Central America (except Brazil and Peru)	20,800	866	.....	.....
West Africa				
French West Africa	.....	.....	161,200	8,478
Gold Coast	.....	.....	11,200	435
Other Parts of West Africa	18,600	750	130,500	3,844
East Africa, including Madagascar	1,000	40	53,900	2,978
Other countries	12,100	460	27,000	1,379
Totals	12,121,100	£527,447	11,968,000	£774,708
Waste and reclaimed rubber	55,000	579	241,900	3,044
Gutta percha and balata	377,200	46,898	428,400	57,463
Rubber substitutes	1,100	40	.....	.....
Totals, unmanufactured	12,554,400	£574,964	12,638,300	£835,215
MANUFACTURED				
Boots and shoes...*doz. pairs*	12,488	£21,721	22,682	£40,092
Tires and tubes				
Pneumatic				
Outer covers	.....	386,349	.....	447,788
Inner tubes	.....	31,065	.....	41,791
Solid tires	.....	9,469	.....	22,545
Other rubber manufactures	.....	87,247	.....	92,007
Totals, manufactured	.....	£535,851	.....	£644,223

Exports

UNMANUFACTURED				
Waste and reclaimed rubber	426,300	£5,654	1,121,200	£12,567
Rubber substitutes	17,100	538	79,700	1,498
Totals, unmanufactured	443,400	£6,192	1,200,900	£14,065
MANUFACTURED				
Boots and shoes...*doz. pairs*	10,962	£19,475	13,789	£21,795
Tires and tubes				
Pneumatic				
Outer covers	.....	177,684	.....	98,025
Inner tubes	.....	34,557	.....	18,968
Solid tires	.....	27,411	.....	22,832
Other rubber manufactures	.....	245,239	.....	242,613
Totals, manufactured	.....	£504,366	.....	£404,233

Exports—Colonial and Foreign

UNMANUFACTURED				
Crude rubber				
To Sweden, Norway and Denmark	146,400	£5,842	73,900	£5,189
Germany	1,446,600	53,776	1,336,300	88,747
Belgium	346,400	12,216	394,300	27,016
France	1,848,300	74,504	3,848,000	271,860
Spain	44,000	1,662	19,200	1,342
Italy	558,100	21,169	1,017,300	71,533
Austria	22,300	1,150	100	4
Other European countries	63,400	2,157	32,000	2,108
United States	2,263,900	82,797	14,369,700	993,700
Canada	36,100	1,160	699,900	39,905
Other countries	71,600	3,386	151,200	10,001
Totals	6,847,100	£259,819	21,941,900	£1,511,405
Waste and reclaimed rubber	300	8	12,400	42
Gutta percha and balata	57,000	6,600	74,500	8,328
Rubber substitutes	.....	.....	.....	.....
Totals, unmanufactured	6,904,400	£266,427	22,028,800	£1,519,775
MANUFACTURED				
Boots and shoes...*doz. pairs*	164	£735	3,686	£5,455
Tires and tubes				
Pneumatic				
Outer covers	.....	28,431	.....	5,766
Inner tubes	.....	2,130	.....	868
Solid tires	.....	933	.....	854
Other rubber manufactures	.....	5,066	.....	2,071
Totals, manufactured	.....	£37,295	.....	£15,014

The Market for Cotton and Other Fabrics

New York

AMERICAN COTTON. The downward course of the spot middlings market, which touched low at 25.80 cents on May 12, rose rapidly the remainder of the month, reaching 28.75 cents on the last day. From this figure the market declined sharply, a total of 160 points, to 27.25 cents on June 5. From that date the market rapidly advanced to 29.90 cents on June 12, and with minor fluctuations closed, on June 27, at 28.20 cents.

The downward movement during the first week in June was attributable to liquidation and the general rise to Census Bureau figures on supply and distribution for May. These suggest no actual famine this year but the surplus will have reached minimum proportions. The opinion has been expressed that "while no acute squeeze seems likely at the end of this season, the situation shows enough tightness to accentuate the uneven distribution of raw material. We cannot have a very large crop and we may have a small one."

EGYPTIAN COTTON. During the past month the market in Egyptian grades has not been active. About 75 per cent of the unsold supply of Delta staples is held by the Staple Cotton Co-operative Association, which is making no offers except in response to firm bids. One month ago Medium Sakellarides was quoted at 32⅞ cents and Uppers at 31¼ cents. June 1 the same grades had advanced to 34⅜ and 33⅜ cents, respectively. One week later they declined to 33½ and 32½ cents, respectively. The market continued weak until the last of the month.

Stocks in Alexandria are reported declining. Repeated replantings of the new crop in the Delta are believed to have set the crop growth back from ten days to three weeks, although some of this lost time may be regained later. The state of the crop is considered satisfactory.

SEA ISLANDS. This cotton continues to be neglected and the supply is very limited.

ARIZONA COTTON. This grade is not in large supply. The market quotations fluctuated in sympathy with those for middlings.

Cotton Fabrics

DUCKS, DRILLS AND OSNABURGS. The month in these lines has been very quiet. Sales have been routine and continuous in small volume at low prices. The mills are curtailing output in all lines for the summer.

RAINCOAT FABRICS. This market has been generally quiet, although fair business has been reported in special lines.

SHEETINGS. Throughout the month just past the market for sheetings has been dull and quiet with prices low and firm. Sales have been routine and seasonal. The mills have curtailed production very considerably.

HOLLANDS. The market is quiet and prices unchanged.

TIRE FABRICS. The tire fabric market has been marking time, somewhat depressed by the seasonal reduction in tire output. About the middle of the month the outlook improved and business started up somewhat to supply the demand among the smaller tire producers, who are maintaining practically their capacity schedule of output. There is less interest in tire fabrics on the part of the larger tire interests. The outlook for summer activity on the part of the fabric mills is not encouraging, as the peak of car production is considered past with the June output and tire stocks are ample.

New York Quotations

June 25, 1923

Prices subject to change without notice

Burlaps

40—7½-ounce	100 yds.	$5.35	@$5.45
40—8-ounce		5.40	@ 5.50
40—10-ounce		7.35	@ 7.45
40—10½-ounce		7.40	@ 7.50

Drills

38-inch 2.00-yard	yard	.23	@
40-inch 3.47-yard		.13⅝	@
52-inch 1.90-yard		.25¼	@
60-inch 1.52-yard		.31⅝	@

Duck

CARRIAGE CLOTH

38-inch 2.00-yard	yard	.25	@
40-inch 1.47-yard		.34	@
72-inch 16.66-ounce		.55	@
72-inch 17.21-ounce		.59	@

MECHANICAL

Hose	pound	.46	@
Belting		.45	@

Tennis

51-inch 1.35-yard	yard	.40½	@

Liners—Non-Sticking

Up to 5-oz. weight, up to 40-inch width	lin. yd.	.35	@
Up to 12-oz. weight, 40-62-inch width		.45	@

Osnaburgs

40-inch 2.35-yard	yard	.21¼	@
40-inch 2.48-yard		.20¼	@
40-inch 3.00-yard		.16¾	@
37½-inch 2.42-yard		.20¼	@

Raincoat Fabrics

COTTON

Bombazine 64 x 60	yard	.15	@
60 x 48		.13	@
Cashmeres, cotton and wool, 36-inch, tan		.55	@
Plaids 60 x 48		.14½	@
56 x 44		.13¾	@
Surface prints 60 x 48		.15¾	@
64 x 60		.16¼	@

Sheetings, 40-inch

48x48, 2.50-yard	yard	.17	@
48x48, 2.85-yard		.14⅝	@
64 x 68, 3.15-yard		.15½	@
56 x 60, 3.60-yard		.13½	@
48 x 44, 3.75-yard		.11½	@
44 x 44, 5.50-yard		.09	@

Sheetings, 36-inch

48 x 48, 5.00-yard	yard	.08¼	@
44 x 40, 6.00-yard		.07⅜	@
40 x 40, 6.00-yard		.07⅜	@

Silks

Canton, 38-inch	yard	.37½	@
Schappe, 35-inch			@

Tire Fabrics

BUILDING

17¼-ounce Sakellaridis, combed	pound	.80	@	.85
17¼-ounce Egyptian, combed		.65	@	.70
17¼-ounce Egyptian, carded		.62	@	.65
17¼-ounce Peeler, carded		.57	@	.60

CORD

15-ounce Egyptian, combed	pound	.68	@	.70
15-ounce Egyptian, carded		.62	@	.65
2½-pick Peeler, carded		.62	@	.63

BREAKER

Leno, Peeler, carded		.60	@

CHAFER

9¼-ounce Egyptian, carded	pound	.70	@	.74
9¼-ounce Peeler, carded		.60	@	

The Truth About Arghan[1]

Frequent references have been made in THE INDIA RUBBER WORLD to the possibilities of Arghan fiber, which comes from the Ananas, or pineapple species, of which there are many varieties, all unclassified and with a great variety of names. That recently named Arghan by the new British syndicate organized to grow it in the Federated Malay States and other British tropical possessions, has been called by the botanists *Ananas macradontis, Bromelia karatas,* or *Bromelia sylvestris,* but by the natives of Colombia it is known as Pita floja. The other varieties of the group in Colombia are known as Penguin, Pinuela, Maya, and Chivy-chivy; their fiber value runs in about this sequence, Penguin being the poorest and Pita floja the best. The poorer grades such as Penguin are found in Cuba, Jamaica, and Mexico, north of 15 degrees, while Pita floja only grows south of that latitude, increasing in extent and luxuriance as the equator is approached. This holds good south of the equator also.

In 1857 Chief Justice Temple of Belize, British Honduras, drew it to the attention of the Royal Society of Arts and sent samples to the Kew Gardens laboratories and also to the British spinners, who declared it equal to Belgian flax.

More recently samples have been sent to Belfast spinners, who have spun it to 25 leas (flax leas) and report it, weight for weight, stronger than steel,[2] stronger than flax, jute, or hemp, with an elasticity of one inch to the yard, of extraordinary resistance to salt water, and easily dyed. It is divisible into .01 of an inch and its ultimate fiber is about one-half inch longer than flax, that is, about two to two and one-quarter inches. It has plenty of natural twist[3] for spinning and no difficulty has been experienced in processing it with flax-spinning machinery. It has not been adapted to cotton-spinning machinery, and that may not be possible, but it has been woven with cotton and its unusual brilliancy makes a beautiful fabric.

Some leaves were sent by interested New Yorkers to an American inventor who successfully decorticated the fiber. A syndicate was then formed to investigate the extent of the growth in Colombia and other neighboring tropical republics. It is safe to say that in the Province of Magdalena alone there are one hundred miles square (not one hundred square miles) of Pita floja, and there are even greater tracts in the Atrato Valley. Its extensive existence is reported in southern Mexico, Guatemala, Honduras, Nicaragua, Costa Rica, Panama, Ecuador, Venezuela, the Guianas, Peru, and Brazil.

The Arghan company has about sixty acres planted in the Federated Malay States and the British Government is offering inducements for the extending of that territory. The original plants were transplanted from British Honduras by Sir Henry Wickham, but only a small percentage survived the trip across two oceans. The increased growth must come from suckers as the plants do not form seeds and therefore cannot increase very rapidly, so that supply is not likely to affect the market for many years.

The probable cost of production may be fairly well arrived at by comparing it with sisal, which grows in the same territory with about the same labor and other conditions, except that sisal has to be cultivated and has an expensive plant and upkeep, while Pita floja grows wild and has no expensive installments or overhead; and although sisal yields four per cent of fiber against half that yield by Pita floja, it is safe to say that the cost of production of the latter cannot much exceed that of sisal, while its comparative market value would be at least twice that of sisal.

The Federated Malay States have granted a concession of 5,000 acres to the Arghan Company, for the cultivation of Arghan fiber in lower Perak, according to an official statement. No premium is charged and the rental is on the basis of 1 Straits dollar, rising to 4 dollars per acre.

Admitting that this fiber is in the flax class, there is a tremendous shortage. The opening is greater than is likely to be met in several years, even if the New York corporation succeeds in putting out one hundred machines weekly, for the capacity of these machines, according to the consular report, does not exceed one hundred pounds each of dry fiber per day.

[1]Geo. A. Lowry in *Textile World*, February 10, 1923.

[2]Cotton, silk and merino wool also are stronger than steel, weight for weight.

[3]Careful microscopic examination shows that it has no natural twist or convolutions similar to cotton.—Editor, *Textile World*.

Automobile Fabric Trade in England

American exports of automobile fabrics to the United Kingdom depend upon that country's automobile manufacture, which in 1922 was estimated at approximately 75,000 cars. During that year our exports of leather cloth and artificial leather to Great Britain amounted to 283,511 pounds, valued at $174,160; while exports of waterproof cloth, automobile cloth and automobile topping were estimated as totaling 192,695 pounds, valued at $81,148. While for automobile interiors various grades of leather or artificial leather are used, the topping found in general as most practicable is a rubber-proofed cotton fabric composed of a thin proofing of rubber inserted as a layer between two inverse thicknesses of cotton material.

Prices for automobile topping vary. A rubber-proofed cloth 72 inches wide is being sold to automobile manufacturers at 6/6 per yard net, in 500 yard lots, cash in 30 days. The "Rexine" brand of imitation leather is being sold at prices ranging from 3/6 to 9/0 per yard, according to quality, and the usual credit terms are cash in 30 days. In the double texture waterproof cloths, twills sell around 5/6 to 5/10 for first class quality 72 inches wide, and the single texture yarn dyed cloths vary from 6/0 to 7/0 per yard, 60 inches wide. The "Pluviusin" product is sold in varying qualities at prices ranging from 3/0 to 8/0 per yard net; the grade used by automobile manufacturers in Manchester is said to be sold at about 5/6 a yard and is 48 inches wide.

Motor hood fabrics are rubber-proofed—either a twill which comes in two colors, khaki and black, or a gray duck. About 15 per cent are of imitation leather and about 5 per cent are of other water-proofed fabrics. H. Longbottom & Co., Ltd., Bradford, England, manufactures a motor hood fabric known as "Kamac," which consists of camels' hair serge having a rubber interlining. The manufacturers claim that camels' hair is less liable to be affected by changes in the weather than other fabrics, and that the cloth rolls in folding, rather than lying flat and subsequently breaking. "Kamac" sells for 17/6 ($4.26) per yard, 72 inches wide.

Cotton Notes

The Southwest Cotton Co., a subsidiary of the Goodyear Tire & Rubber Co., in a deal with the Mutual Cotton & Oil Co., of Phœnix, Arizona, gives the latter practically control of the ginning industry of Salt River Valley, excepting the Goodyear and Litchfield ranches. The Mutual concern has $1,000,000 capital, and will handle most of the Pima Cotton Growers' Associations' output of 50,000 bales of long staple cotton.

Arizona has gone in strong this year for cotton raising, the planted acreage reaching 127,100, an increase of 27 per cent over 1922. While Pima acreage has dropped 38 per cent, short staple has increased 243 per cent.

World spinner's takings of American cotton, according to a report of the Liverpool Cotton Exchange, for the period August 1 to May 23, totaled 10,627,000 bales for this year, as compared with 10,770,000 bales for last season. Of this total, Great Britain took for the two years respectively, 1,370,000 bales and 1,524,000 bales, America 5,873,000 bales and 5,441,000 bales, Continental Europe 2,804,000 bales and 2,996,000 bales, Japan and Mexico 580,000 bales and 809,000 bales.

The Market for Chemicals and Compounding Ingredients

New York

THE seasonal reduction of output in most rubber manufacturing lines has not seriously interfered with the demand for the cheaper and standard compounding ingredients and pigments. Business generally is routine but totals large tonnage.

ANILINE. Prices remain steady, supply abundant and movement slow.

ASBESTINE. This ingredient, an old favorite for compounding in the mechanical goods trade, is as standard as whiting for that purpose and in constant large volume demand.

BARYTES. There has been no change in recent prices, which seem well stabilized. Consumption is exceeding all records, particularly in the manufacture of lithopone.

BENZOL. The demand has not improved above routine movement. Stocks are increasing steadily and the surplus moving into export.

BLANC FIXE. Manufacturers of blanc fixe are reported producing at capacity with consuming requirements above normal.

CARBON BLACK. Output is contracted well ahead for the remainder of the year at from 15 to 17 cents. Supplies for immediate delivery are scarce. The manufacture of carbon black in Louisiana is said to have become a political issue, due to state legislation for the conservation of the natural gas supply. This with the increasing consumption of the black is maintaining the high price level.

CHINA CLAY. China clay has gained general approval as a rubber compounding ingredient. The consuming demand is so good that the imported is sold to arrive.

DRY COLORS. The sale of dry colors is on a seasonal basis. The trade is busy and outlook favorable.

LITHARGE. The market is described as waiting, and no change in price. Consumers' requirements are routine.

LITHOPONE. Manufacturers of lithopone are still making capacity output without fully meeting the trade demands. Larger output is planned for next year. The same prices are being quoted for business for the third quarter year.

SUBLIMED LEAD. The demands for sublimed lead are reported increasing. At present trade is routine.

SULPHUR. This staple in all rubber manufacturing lines is always in large routine demand at stabilized price.

TALC. Both domestic and imported grades of high and low qualities are in active request and indispensable in every rubber mill.

SOLVENT NAPHTHA. Supplies are restricted in volume, not much spot being available.

WHITING. Whiting is in active movement as a standard compounding ingredient at low and steady price.

ZINC OXIDE. A large forward business is booked for six months ahead without advance in price over the recent past quotations.

New York Quotations

June 25, 1923

Accelerators, Inorganic

Lead, carbonate	lb.	$0.09¾	@
Lead, red	lb.	.11¾	@
sublimed blue	lb.	.09¼	@
sublimed white	lb.	.09¼	@
Lime, flour	lb.	.02½	@
R. M. hydrated	ton	20.00	@
Litharge, domestic	lb.	*.10½	@ .12
imported	lb.	*.17	@
Magnesia, carbonate, light	lb.	.08	@ .09
calcined, light (bbls.)	lb.	.23	@ .24
calcined, ex. light (bbls.)	lb.	.45	@
calcined, md. light (bbls.)	lb.	.15	@
calcined, heavy (bbls.)	lb.	.05	@ .06
Orange mineral A.A.A.	lb.	.14½	@
Sulzin, ton lots	lb.		@
less ton lots	lb.		@

Accelerators, Organic

A-7	lb.	.75	@ .85
Accelerene (f. o. b. English port)	lb.	13s.	@
Aldehyde ammonia crystals	lb.	.90	@ .95
Aniline (f. o. b.) factory	lb.	.16½	@ .17½
sulphate	lb.	.33	@
Cryline	lb.	.60	@
Diphenyl diamino carbazol	lb.	.40	@
Diphenylguanidine	lb.	1.20	@
Ethylidene aniline	lb.	.70	@ .75
Excellerex	lb.	.45	@ .50
Formaldehyde	lb.	.15	@ .15½
Formaldehyde aniline	lb.	.52½	@
H. R.	lb.		@
Hexamethylene tetramine	lb.	.95	@ .97½
Lead oleate (bbls.)	lb.	.16	@
Methylene aniline	lb.	.40	@ .50
No. 999	lb.	.17	@
Paraldehyde	lb.	.17	@ .19
Para-nitros-dimethyl aniline	lb.	1.10	@
Paraphenylene diamine	lb.	1.55	@ 1.60
Quinodine	lb.	.65	@
Super-sulphur, No. 1	lb.	.50	@ .60
No. 2	lb.	.25	@ .30
Super-X	lb.	.35	@
Tetramethyl thiuramdisulphide	lb.	6.00	@
Thiocarbanilide	lb.	.27	@ .35
Triphenylguanidine	lb.	1.10	@
Vul-Ko-Cene	lb.	.35	@

*Nominal.

Acids

Acetic 28% (bbls.)	cwt.	$3.38	@$3.63
glacial, 99%	cwt.	12.78	@13.03
Cresylic (97% straw color)	gal.	1.15	@ 1.20
(95 dark)	gal.	1.10	@ 1.15
Sulphuric, 66 degrees	ton	15.00	@16.00

Alkalies

Caustic soda	lb.	.03½	@ .03¾
flake, 76% (factory)	cwt.	3.50	@
solid, 76% (factory)	cwt.	3.15	@

Colors

BLACK

Bone, powdered	lb.	.05½	@ .07½
Carbon black	lb.	.18	@ .22
pressed	lb.	.19	@ .24
Drop	lb.	.07½	@ .10
Gritless black	lb.	.40	@
Ivory black	lb.	.15	@ .45
Lampblack	lb.	.12	@ .40
Micronex	lb.	.19	@ .24
Shawinigan	lb.	.17	@ .18

BLUE

Cobalt	lb.	.21	@ .26
Gritless blue	lb.	3.50	@
Prussian	lb.	.55	@ .60
Ultramarine	lb.	.15	@ .35

BROWN

Iron oxide	lb.	.04½	@ .05½
Sienna, Italian	lb.	.06½	@ .07½
Umber, Turkey	lb.	.06	@ .07½

GREEN

Chrome, light	lb.	.32	@ .34
medium	lb.	.35	@ .36
dark	lb.	.36	@ .45
commercial	lb.	.12	@
tile	lb.	.13	@ .15
Gritless green	lb.	3.50	@
Oxide of chromium	lb.	.39¼	@ .67

RED

Antimony, crimson	lb.	$0.40	@
crimson, 15/17% free	lb.	.36	@ .45
crimson, R.M.P. No. 3	lb.	.50	@
crimson F.	lb.	.35	@
Antimony, golden	lb.	.20	@
golden R.M.P. No. 7	lb.	.21	@
golden, 15/17% free	lb.	.20	@
golden, No. 1	lb.	.30	@
golden, No. 2	lb.	.20	@
7-A	lb.	.35	@
vermilion 15/17% F. S.	lb.	.50	@
vermilion 5% F. S.	lb.	.65	@
Arsenic sulphide, red	lb.	.15	@
Gritless red (four shades)	lb.	3.50	@
purple	lb.	2.50	@
Indian	lb.	.08	@ .12
Indian maroon, English	lb.	.08	@
Iron oxide, reduced	lb.	.08	@ .12
pure bright	lb.	.12	@ .14
Maroon oxide	lb.	.08	@ .12
Red oxide, English	lb.	.12	@
Spanish	lb.	.03	@ .04
Oximony	lb.	.15	@
Para toner	lb.	1.00	@ 1.10
Spanish natural	lb.	.03½	@ .04½
Toluidine toner	lb.	2.75	@ 3.00
Venetian	lb.	.03½	@ .06
Vermilion, American	lb.	.25	@ .30
English quicksilver	lb.	1.30	@ 1.40

WHITE

Albalith	lb.	.07	@ .07½
Aluminum bronze	lb.	.55	@ .60
Lithopone, domestic	lb.	.07	@ .07½
Azo	lb.	.07	@ .07½
Red Seal, imported	lb.	.07	@ .07¼

Zinc oxide:

American Horse Head			
Special	lb.	.08½	@ .09
XX red	lb.	.08	@ .08½
French process, Florence			
Green seal	lb.	.10¼	@ .11¼
Red Seal	lb.	.09¾	@ .10¼
White seal	lb.	.12	@ .12¼
Azo (factory):			
ZZZ (lead free)	lb.	.08	@ .08½
ZZ (—5% leaded)	lb.	.07¼	@ .07¾
Z (8.15% leaded)	lb.	.07¼	@ .07¾

Colors—*Continued*

YELLOW

Chrome, light and med.	lb.	$0.20	@
Gritless yellow	lb.	3.50	@
India rubber	lb.	.87½	@
Ochre, domestic	lb.	.02½	@ .03
imported	lb.	.03¼	@ .03¾

Compounding Ingredients

Aluminum flake (carloads)	ton	29.00	@
filler	ton	23.00	@
hydrate, light	lb.	.19	@ .21
Ammonia carbonate	lb.	.09	@ .10¾
Asbestine (carloads)	ton	20.00	@
Aluminum silicate	ton	22.50	@25.00
Barium, carbonate, precip.	ton	68.00	@75.00
dust	lb.	.05	@
Barytes, pure white C. L.	ton	23.90	@
off color	ton	20.00	@
uniform floated	ton	23.90	@
Basofor	lb.	.04¾	@
Blanc fixe	lb.	.04¼	@ .04½
Carrara filler (factory)	lb.	.01¾	@
Chalk, precip. extra light	lb.	.04¼	@ .05
heavy (f.o.b. factory)	lb.	.03½	@ .04
China clay, Dixie	ton	22.00	@32.00
Blue ribbon (carloads)	ton	14.00	@
Blue Ridge	ton	20.00	@30.00
Super Dixie	lb.	.02½	@
Cotton flock, black	lb.	.12	@ .13
light-colored	lb.	.13	@ .15
white	lb.	.18	@ .23
Cotton linters clean mill-run	lb.	.06	@
Fossil flour (powdered)	ton	60.00	@
(bolted)	ton	60.00	@
Glue, high grade	lb.	.30	@ .40
medium	lb.	.20	@ .26
low grade	lb.	.16	@ .19
Graphite, flake	lb.	.06½	@ .12
amorphous	lb.	.05	@
Infusorial earth (powd.)	ton	60.00	@
(bolted)	ton	65.00	@
Lime (bolted)	lb.	.02	@
Mica, amber	lb.	.05	@
powdered	lb.	*.15	@
white	lb.	.06	@
Pumice stone, powdered	lb.	.03	@ .05
Rotten st., powd. (bbls.)	lb.	.02½	@ .04½
Soap bark, cut	lb.	.09	@ .10
Soapstone, powdered, gray	ton	12.00	@
Sodium bicarbonate (bbls.)	lb.	.02½	@
Starch, powd. corn (bags)	cwt.	3.22	@ 3.22
(bbls.)	cwt.	3.49	@ 3.59
Talc, soapstone	ton		@
Terra blanche	ton	23.50	@25.00

* Nominal.

Chemical Market—*Continued*

New York Quotations

June 25, 1923

Whiting, Alba	cwt.		@
chalk	ton		@
commercial	cwt.	$1.00	@$1.25
English cliffstone	cwt.	1.50	@ 2.50
gilders (bolted)	cwt.	1.10	@
K. T.	ton		@
Perfection (carloads)	ton	22.00	@25.00
Quaker	ton	13.00	@15.00
Superfine, L. H. B.	ton	13.50	@22.50
W. T.	ton	20.00	@
York	ton	12.00	@
Wood pulp, XXX	ton	35.00	@
X (f. o. b. factory)	ton	25.00	@

Mineral Rubber

Genasco (factory)	ton	50.00	@52.00
Gilsonite	ton	65.00	@
Hard hydrocarbon	ton	33.00	@42.00
Ohmlac Kapak, K-R	ton	60.00	@
K-4	ton	175.00	@
Soft hydrocarbon	ton	30.00	@40.00
320/340 M. P. hydrocarbon	ton	45.00	@50.00
300/310 M. P. hydrocarbon	ton	40.00	@45.00
Pioneer, M. R., solid (fac.)	ton	42.00	@44.00
M. R. granular	ton	52.00	@54.00
Robertson, M. R., solid	ton	35.00	@75.00
M. R. granular (factory)	ton	54.50	@72.50
Rubrax (factory)	ton	60.00	@
Synpro, gran. M. R. (fac.)	ton	55.00	@70.00

Oils

Castor, No. 1, U. S. P.	lb.	.15	@
No. 3, U. S. P.	lb.	.14½	@
Corn	lb.	.12½	@
Cotton	lb.	.12	@
Cycline	gal.	.35	@ .38
Glycerine	lb.	.16	@ .16½
Linseed, raw	gal.	1.15	@
Palm lagos	lb.	.07	@ .07¾
Palm, niger	lb.	.08½	@ .09
Peanut	lb.	.15	@
Petrolatum, standard	lb.	.06	@ .08
Petrolatum, sticky	lb.	.08	@ .10
Pine, steam distilled	gal.	.70	@
Rapeseed, refined	gal.	.85	@
blown	gal.	1.00	@
Rosin	gal.	.45	@ .50
Synpro	gal.		@
Soya bean	lb.	.13	@
Tar	gal.	.27	@ .28
Woburn	lb.	.04½	@

Resins and Pitches

Tar, pine, retort	bbl.	$11.75	@12.50
kiln	bbl.	12.00	@13.50
Pitch, Burgundy	lb.	.05	@
coal tar	lb.	.02	@
Fluxol hardwood	ton	40.00	@60.00
pine tar	lb.	.03	@
ponto	lb.	.08	@
Rosin, K (bbl.)	280 lbs.	6.50	@
strained (bbl.)	280 lbs.	6.40	@
Shellac, fine orange	lb.	*.90	@
substitute	gal.	2.00	@

Solvents

Acetone (98.99% drums [6.62 lbs. per gal.])	lb.	*.25	@
Benzol (90% drums [7.21 lbs. per gal.])	gal.		@
pure (drums)	gal.	.42	@
Carbon bisulphide (dms. [10.81 lbs. per gal.])	lb.	.06½	@ .07
tetrachloride (drums, [13.28 lbs. per gal.])	lb.	.09	@ .10¾
Motor gasoline (steel bbls.)	gal.	.21½	@
Naphtha, V. M. & P.	gal.	.20½	@
solvent (drums extra)	gal.	.28	@
59@61	gal.	17.50	@
63@66	gal.	19.50	@
66@65	gal.	20.50	@
Cymene (factory)	gal.	1.50	@
Toluol, pure (7.21 lbs. per gal.)	gal.		@
Turpentine, spirits	gal.	1.21	@
wood, steam distilled	gal.	1.10	@

Substitutes

Black	lb.	.09	@ .14
Brown	lb.	.10	@ .15
White	lb.	.10	@ .16
Brown factice	lb.	.09	@ .15
White factice	lb.	.10	@ .16

Vulcanizing Ingredients

Black hypo	lb.	.38	@
13% F. S.	lb.	.21	@
Sulphur chloride	lb.	.05	@ .06
Sulphur, Bergenport brand, 100% pure (bbls.)	cwt.	2.75	@ 3.05
(bags)	cwt.	2.50	@ 2.80
Sulphur flour (bbls.)	cwt.	2.75	@ 3.30
(bags)	cwt.	2.50	@ 3.05

(See also Colors—Antimony)

Waxes

Wax, beeswax, white, com	lb.	.45	@
ceresine, white	lb.	.12	@
carnauba	lb.	.20	@
montan	lb.	.04½	@ .05
ozokerite, black	lb.	.18	@
green	lb.	.27	@ .28
paraffine	lb.	.02¾	@ .05
sweet wax	lb.	.10	@ .12

Practical Device to Detect Carbon Monoxide

Owing to the absence of color or odor in carbon monoxide itself, it is often difficult to detect its presence or quantity in atmospheres in which it is necessary for human beings to work. To meet the need for a dependable means of testing for this insidious gas, the "M-S-A" carbon monoxide detector was devised.

This patented device is simple, rugged, and accurate, giving immediate warning of the presence of carbon monoxide gas and indicating the percentage. The different parts are made of rubber, glass, metal, etc., according to whichever best meets the requirements for that particular part.

A connecting head fitting provided with suitable by-passes, valves, filters, screens, and gaskets,

"M-S-A" Carbon Monoxide Detector

of which parts a number are rubber, is located between a large rubber bulb and a metal tube containing "Gasorbent," a material that absorbs all gases except carbon monoxide. On one side of this tube is attached a color scale, calibrated from .05 to 1 per cent. The detector tube is made of heavy glass and contains "Hoolamite," a patented chemical mixture sensitive to carbon monoxide and one that turns green when coming in contact with it.

By squeezing the bulb a definite number of times, air passes through the gasorbent tube around through the head into the detector tube and out at the open end. By comparing with the color scale the color imparted to the hoolamite, the amount of carbon monoxide present is indicated in percentages.

This detector is especially adapted for use around producer gas plants and foundries; in manholes, sewers, stokeholes, and garages; and in factories and burning buildings where gas mains are liable to become broken.

AMONG THE PRODUCTS OF THE B & M SPECIALTY CO., 1457 Broadway, New York, N. Y., are: Rubber aprons for home, office, and bungalow wear, for surgeons and dentists, and for children; shampoo bibs and combing jackets; and infants' crib sheets, catchall bibs, and "Weetot" ventilated pants.

A NEW TOY CALLED THE "DAWDY DOLL" HAS THE BODY OF sponge rubber tied to form hands and feet, while the head is one of the rubber balls with molded features and a red tongue that darts out when the ball is pressed.—James A. Hetherington, drug store, 53 East 42d street, New York, N. Y.

Crude Rubber Arrivals at New York as Reported by Importers

Parás and Caucho

	Fine	Medium	Coarse	Caucho	Cameta
MAY 16. By "Cameens," Manáos.					
Meyer & Brown, Inc	¶33,600	.....	.....	6,720	.....
MAY 17. By "Michael," Manáos.					
Meyer & Brown, Inc	¶103,040	.....	2,240	33,600	.....
MAY 26. By "Bronte," Pará, Manáos and Bolivia.					
H. A. Astlett & Co	29,176	.....	14,873	310	.....
H. A. Astlett & Co	‡4,243	.....	‡5,211	.....	.....
Paul Bertuch	.....	.....	.....	8,667	.....
General Rubber Co	.....	.....	.....	.....	64,960
Poel & Kelly, Inc	22,200	37,000	44,800	.....	.....
JUNE 1. By "Benedict," Pará and Manáos.					
H. A. Astlett & Co	32,437	6,618	12,870	15,014	.....
Paul Bertuch	69,961	458	44,947	75,102	.....
General Rubber Co	52,640	.....	.....	100,800	.....
F. R. Henderson & Co., Inc	13,000	4,400	.....	23,000	.....
L. Littlejohn & Co., Inc	95,660	.....	.....	.....	.....
Meyer & Brown, Inc	¶73,360	.....	13,440	52,640	.....
Poel & Kelly, Inc	5,083	687	13,321	.....	.....
JUNE 4. By "Alban," Pará and Manáos.					
H. A. Astlett & Co	22,070	.....	8,515	.....	.....
H. A. Astlett & Co	.....	.....	.....	‡23,100	.....
Paul Bertuch	44,273	1,095	17,803	4,628	.....
F. R. Henderson & Co., Inc	28,000	2,240	4,000	4,800	.....
L. Littlejohn & Co., Inc	145,600	.....	.....	.....	.....
Meyer & Brown	¶63,840	.....	.....	.....	.....
JUNE 10. By "Virgil," Pará and Manáos.					
H. A. Astlett & Co	‡31,990	.....	‡33,260	.....	.....
General Rubber Co	161,280	.....	20,160	20,160	20,160
L. Littlejohn & Co., Inc	24,220	.....	.....	.....	.....
Poel & Kelly, Inc	39,600	2,143	21,434	18,902	.....
JUNE 11. By "Southern Cross," Montevideo.					
Paul Bertuch	27,704	.....	.....	.....	.....
JUNE 17. By "Dominic," Manáos.					
Meyer & Brown, Inc	¶8,400	.....	.....	.....	.....

‡Washed and dried in Brazil. ¶Fine and medium.

Plantations

(Figured at 180 lbs. to the bale or case)

	Pounds
MAY 14. by "Port Macquarrie," London.	
Fisk Rubber Co	1,792,677
MAY 19. By "Agamemnon," Far East.	
H. A. Astlett & Co	257,600
Baird Rubber & Trading Co	195,900
General Rubber Co	859,060
Hood Rubber Co	33,600
Hood Rubber Co	*39,145
J. T. Johnstone & Co., Inc	138,078
L. Littlejohn & Co., Inc	1,500,800
Meyer & Brown, Inc	268,800
H. Muehlstein & Co	123,200
Poel & Kelly, Inc	179,581
Fred Stern & Co., Inc	510,758
Charles T. Wilson Co., Inc	82,880
MAY 19. "Maine," London.	
J. T. Johnstone & Co., Inc	61,487
MAY 19. By "Steel Worker," Batavia.	
H. A. Astlett Co	67,200
Baird Rubber & Trading Co	112,000
H. Muehlstein & Co	179,200
MAY 20. By "Baltic," London.	
Poel & Kelly, Inc	128,185
MAY 21. By "City of Benares," Far East.	
H. A. Astlett & Co	22,400
Baird Rubber & Trading Co	96,000
Charles T. Wilson Co., Inc	106,400
MAY 21. By "City of Westminster," Far East.	
General Rubber Co	134,400
Meyer & Brown, Inc	112,000
H. Muehlstein & Co	67,200
Poel & Kelly, Inc	168,000
Charles T. Wilson Co., Inc	123,200
MAY 22. By "Verentia," London.	
General Rubber Co	754,200
L. Littlejohn & Co., Inc	253,145
Poel & Kelly, Inc	142,514
MAY 23. By "Eastern Knight," Far East.	
L. Littlejohn & Co., Inc	67,200
Poel & Kelly, Inc	33,600
MAY 23. By "London Exchange," London.	
Baird Rubber & Trading Co	22,400
MAY 23. By "Missouri," London.	
F. R. Henderson & Co., Inc	77,080
General Rubber Co	4,480
MAY 23. By "Port Lincoln," London.	
Poel & Kelly, Inc	195,098
MAY 23. By "Veendyk," Rotterdam.	
L. Littlejohn & Co., Inc	44,800
MAY 26. By "Kosmo," Far East.	
Baird Rubber & Trading Co	56,000
General Rubber Co	280,000
L. Littlejohn & Co., Inc	432,000
Meyer & Brown, Inc	56,000
Poel & Kelly, Inc	253,600
MAY 27. "Elveric," Far East.	
Baird Rubber & Trading Co	22,400
General Rubber Co	313,600
Hood Rubber Co	93,200
L. Littlejohn & Co., Inc	414,400
Poel & Kelly, Inc	22,400
MAY 29. By "President Monroe," Far East.	
General Rubber Co	811,989
MAY 30. By "Mesaba," Far East.	
Baird Rubber & Trading Co	113,000
F. R. Henderson & Co., Inc	4,600
Charles T. Wilson Co., Inc	112,000
MAY 31. By "City of Lincoln," Far East.	
H. A. Astlett & Co	593,600
Baird Rubber & Trading Co	179,200
General Rubber Co	463,680
Hood Rubber Co	*134,600
J. T. Johnstone & Co., Inc	210,673
L. Littlejohn & Co., Inc	1,746,000
L. Littlejohn & Co., Inc	*112,000
Meyer & Brown, Inc	627,200
H. Muehlstein & Co	145,600
Poel & Kelly, Inc	278,018
Charles T. Wilson Co., Inc	112,000
JUNE 2. By "Havana Maru," Far East.	
Baird Rubber & Trading Co	67,200
H. Muehlstein & Co	67,200
L. Littlejohn & Co., Inc	526,400
Fred Stern & Co., Inc	72,800
JUNE 5. By "Adriatic," Liverpool.	
Fred Stern & Co., Inc	10,542
JUNE 3. By "Steel Navigator," Singapore.	
Baird Rubber & Trading Co	123,200
General Rubber Co	44,800
F. R. Henderson & Co., Inc	378,900
Hood Rubber Co	22,400
L. Littlejohn & Co., Inc	548,800
Meyer & Brown, Inc	56,000
H. Muehlstein & Co	*22,400
H. Muehlstein & Co	44,800
Poel & Kelly, Inc	268,663
Fred Stern & Co., Inc	11,200
Charles T. Wilson Co., Inc	22,400
JUNE 3. By "Veendam," Amsterdam.	
L. Littlejohn & Co., Inc	22,400
JUNE 4. By "West Cannon," Far East.	
Baird Rubber & Trading Co	136,000
General Rubber Co	448,562
F. R. Henderson & Co., Inc	38,962
L. Littlejohn & Co., Inc	1,746,000
Meyer & Brown, Inc	548,800
H. Muehlstein & Co	134,400
Fred Stern & Co., Inc	158,471
Charles T. Wilson Co., Inc	56,000
JUNE 5. "London Mariner," London.	
J. T. Johnstone & Co., Inc	61,439
JUNE 7. By "City of Sparta," Far East.	
Baird Rubber & Trading Co	83,200
Baird Rubber & Trading Co	*56,000
General Rubber Co	77,280
J. T. Johnstone & Co., Inc	61,600
L. Littlejohn & Co., Inc	268,800
H. Muehlstein & Co	89,600
Poel & Kelly, Inc	22,430
Charles T. Wilson Co., Inc	44,800
JUNE 7. By "Eurybates," Far East.	
H. A. Astlett & Co	78,400
Baird Rubber & Trading Co	1,792,000
General Rubber Co	678,760
Hood Rubber Co	*111,890
J. T. Johnstone & Co., Inc	24,640
L. Littlejohn & Co., Inc	1,187,200
Meyer & Brown Co	421,120
H. Muehlstein & Co	179,200
Poel & Kelly, Inc	*90,300
Fred Stern & Co., Inc	123,200
Charles T. Wilson Co., Inc	235,200
JUNE 8. By "Carmania," London.	
General Rubber Co	329,280
JUNE 8. By "Celtic Prince," Ear East.	
H. A. Astlett Co	201,600
Baird Rubber & Trading Co	218,400
General Rubber Co	441,280
F. R. Henderson & Co., Inc	42,984
Hood Rubber Co	55,936
Hood Rubber Co	*22,400
J. T. Johnstone & Co., Inc	36,976
L. Littlejohn & Co., Inc	1,232,000
L. Littlejohn & Co., Inc	*33,600
Meyer & Brown	461,440
H. Muehlstein & Co	291,200
Fred Stern & Co., Inc	16,800
Charles T. Wilson Co., Inc	78,400
JUNE 8. By "Malacca Maru," Far East.	
General Rubber Co	501,760
L. Littlejohn & Co., Inc	112,000
Poel & Kelly, Inc	53,600
Charles T. Wilson Co., Inc	11,200
JUNE 8. By "Maryland," London.	
General Rubber Co	1,691,782
F. R. Henderson & Co., Inc	10,200
L. Littlejohn & Co., Inc	224,000
JUNE 10. By "President Polk," London.	
General Rubber Co	909,440
JUNE 15. By "Koyo Maru," Far East.	
Baird Rubber & Trading Co	56,000
L. Littlejohn & Co., Inc	739,200
JUNE 15. By "Mississippi," London.	
Baird Rubber & Trading Co	224,000
L. Littlejohn & Co., Inc	15,293
JUNE 16. By "Venusia," London.	
Baird Rubber & Trading Co	112,000
L. Littlejohn & Co., Inc	112,694
JUNE 16. By "Volendam," Amsterdam.	
L. Littlejohn & Co., Inc	190,400
Meyer & Brown, Inc	62,720
Poel & Kelly, Inc	75,945
JUNE 19. By "London Merchant," London.	
Fred Stern & Co., Inc	101,433
JUNE 22. "Bolton Castle," Singapore.	
J. T. Johnstone & Co., Inc	35,679

*Arrived at Boston.

Balata

	Pounds
JUNE 4. By "Alban," Manáos.	
Paul Bertuch	2,932
JUNE 7. By "Surinam," Paramaribo.	
Middleton & Co	3,182

Africans

	Pounds
MAY 27. By "Cedric," Liverpool.	
Fred Stern & Co., Inc	2,357
JUNE 6. By "Sarcoxie," Bordeaux.	
Poel & Kelly, Inc	42,895
JUNE 10. By "Carmania," Liverpool.	
Poel & Kelly, Inc	16,152
JUNE 11. By "Orca," Hamburg.	
Poel & Kelly, Inc	87,300

Gutta Percha

	Pounds
JUNE 7. By "Eurybates," Singapore.	
Poel & Kelly, Inc	2,240

Gutta Siak

	Pounds
MAY 19. By "Agamemnon," Singapore.	
L. Littlejohn & Co., Inc	56,000
Fred Stern & Co., Inc	33,600
JUNE 7. By "Eurybates," Singapore.	
L. Littlejohn & Co., Inc	6,000
JUNE 9. By "Sultan Prince," Singapore.	
L. Littlejohn & Co., Inc	56,000

Pontianak

	Pounds
MAY 19. By "Steel Worker," Java.	
L. Littlejohn & Co., Inc	302,400
JUNE 9. By "Sultan Prince," Singapore.	
L. Littlejohn & Co., Inc	56,000

Guayule

	Pounds
MAY 21-JUNE 16. By "Railways," Mexico.	
Continental Mexican Rubber Co	418,060

Exports of India Rubber Manufactures from the

EXPORTED TO EUROPE	Belting Value	Hose Value	Packing Value	Thread Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Canvas Shoes with Rubber Soles Pairs	Canvas Shoes with Rubber Soles Value	Soles and Heels Value	Leather Cloth or Artificial Leather Value	Waterproofed Auto Cloth Value
Azores and Madeira Islands	.....	.....	.....	.....	30	$117	.....	.....	.....	.....	.....	.....	.....
Belgium	$695	$2,992	$878	$6,320	.....	.....	.....	.....	.....	.....	$24	$1,882	$211
Denmark	.....	1,945	547	.....	92	292	1,631	$2,147	14,881	$11,361	167	11,439	.....
Esthonia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Finland	3,877	274	.....	.....	.....	.....	.....	.....	.....	.....	.....	95	.....
France	1,220	1,818	1,237	36,445	.....	.....	.....	.....	.....	.....	596	42,630	2,762
Germany	.....	219	85	.....	.....	.....	.....	.....	.....	.....	.....	556	.....
Gibraltar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Greece	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iceland and Faroe Islands	.....	.....	.....	.....	115	324	.....	.....	.....	.....	.....	5,951	7,170
Italy	.....	.....	.....	12,194	535	4,071	14	22	768	535	.....	.....	.....
Latvia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Malta, Gozo, etc	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	470	.....
Netherlands	.....	2,423	.....	.....	.....	.....	36	24	.....	.....	1,142	6,200	.....
Norway	.....	182	.....	.....	542	1,568	1,796	5,749	9,312	7,021	.....	2,043	.....
Poland and Danzig	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Portugal	.....	.....	.....	.....	437	1,649	.....	.....	.....	.....	150	406	57
Rumania	.....	136	1,266	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Spain	1,554	.....	.....	.....	.....	.....	3	2	.....	.....	9	6,918	.....
Sweden	4,031	188	8	.....	817	2,707	108	260	.....	.....	672	17,398	.....
Switzerland	442	.....	.....	1,656	.....	.....	616	400	.....	.....	.....	.....	.....
England	6,274	19,514	5,041	56,640	3,426	10,208	360	175	58,038	39,060	1,244	18,099	7,640
Scotland	941	406	543	.....	.....	.....	.....	.....	1,488	816	.....	19,794	945
Ireland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Austria	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	985
TOTALS, EUROPE	$19,034	$30,097	$9,605	$113,255	5,994	$21,536	4,564	$8,779	84,487	$58,793	$4,004	$133,881	$19,770
NORTH AMERICA													
Canada—Maritime Provinces	$87	$260	$155	.....	1,812	$6,061	4	$4	156	$161	$2	.....	.....
Quebec and Ontario	10,318	6,541	8,334	$3,758	232	812	258	656	708	989	1,945	$34,324	$26,717
Prairie Provinces	240	652	90	.....	39	119	39	67	1,044	1,092	.....	1,479	.....
Brit. Columbia and Yukon	310	171	500	.....	410	1,739	35	126	384	247	.....	1,134	165
British Honduras	.....	75	.....	.....	.....	.....	.....	.....	55	160	222	.....	.....
Costa Rica	198	976	294	.....	.....	.....	.....	.....	.....	.....	467	.....	.....
Guatemala	116	177	.....	.....	.....	.....	4	11	1,837	1,414	300	.....	.....
Honduras	41	580	140	.....	.....	.....	204	145	760	1,085	821	.....	.....
Nicaragua	134	24	58	8	.....	.....	.....	.....	552	454	1,506	3	126
Panama	601	1,984	219	.....	.....	.....	296	314	749	915	661	362	957
Salvador	33	319	.....	.....	.....	.....	.....	.....	.....	.....	6,191	.....	.....
Mexico	27,216	13,320	10,692	.....	75	260	1,871	1,471	24,206	19,699	11,466	2,400	719
Miquelon and St. Pierre Islands	.....	.....	.....	.....	108	300	.....	.....	.....	.....	.....	.....	.....
Newfoundland and Labrador	594	2,119	475	.....	8,039	22,238	1,659	1,188	13,657	8,565	823	68	.....
Bermuda	.....	48	.....	.....	.....	.....	11	9	891	872	75	110	.....
Barbados	.....	22	.....	.....	.....	.....	.....	.....	204	172	.....	95	125
Jamaica	265	449	.....	.....	.....	.....	.....	.....	2,779	2,587	83	395	707
Trinidad and Tobago	335	212	647	.....	.....	.....	.....	.....	436	396	90	.....	.....
Other British West Indies	61	146	473	.....	.....	.....	72	170	1,638	1,695	57	.....	47
Cuba	3,432	14,308	3,091	.....	.....	.....	7,704	4,401	128,042	78,037	7,162	8,234	4,828
Dominican Republic	59	140	66	.....	.....	.....	12	6	507	442	805	.....	.....
Dutch West Indies	265	.....	.....	.....	.....	.....	.....	.....	4,741	3,852	45	81	.....
French West Indies	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Haiti	94	229	.....	.....	.....	.....	36	38	492	479	422	.....	153
Virgin Islands of United States	.....	.....	18	.....	.....	.....	.....	.....	466	314	101	.....	.....
TOTALS, NORTH AMERICA	$44,399	$42,761	$25,232	$3,766	10,715	$31,529	12,205	$8,606	184,304	$123,627	$33,244	$48,685	$34,544
SOUTH AMERICA													
Argentina	$470	$2,700	$873	.....	120	$355	9,586	$9,000	113,000	$88,969	$5,184	$7,184	$14,737
Bolivia	2,060	298	417	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Brazil	8,030	3,931	579	$238	.....	.....	500	407	.....	.....	.....	2,962	2,092
Chile	7,598	2,906	835	145	559	3,653	.....	.....	.....	.....	67	6,371	1,088
Colombia	2,396	783	205	.....	.....	.....	24	11	2,291	1,931	4,091	401	1,192
Ecuador	114	58	.....	.....	.....	.....	24	18	264	215	71	209	.....
British Guiana	.....	2,236	.....	.....	.....	.....	.....	.....	1,608	1,306	.....	.....	.....
Dutch Guiana	.....	.....	.....	.....	.....	.....	.....	.....	364	345	.....	.....	.....
Peru	2,555	4,829	193	.....	60	249	.....	.....	.....	.....	1,058	.....	.....
Uruguay	.....	874	235	.....	.....	.....	9,518	8,039	.....	.....	885	907	1,207
Venezuela	.....	888	1,021	78	.....	.....	120	93	.....	.....	1,279	999	826
TOTALS, SOUTH AMERICA	$23,723	$19,503	$4,358	$461	739	$4,257	19,772	$17,568	117,527	$92,766	$12,635	$19,033	$21,142
ASIA													
Aden	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
British India	$2,414	$2,184	$163	.....	.....	.....	984	$1,378	1,258	$1,059	$227	$2,908	$1,062
Ceylon	.....	328	.....	.....	.....	.....	.....	.....	69	59	.....	.....	.....
Straits Settlements	1,607	.....	.....	.....	.....	.....	376	316	323	229	14	209	320
China	8,665	273	4,090	.....	.....	.....	256	317	216	348	.....	466	754
Chosen	225	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Java and Madura	82	591	45	.....	.....	.....	.....	.....	42	41	175	735	.....
Other Dutch East Indies	521	690	.....	.....	.....	.....	.....	.....	.....	.....	.....	322	.....
Far Eastern Republic	.....	8	.....	.....	2,016	$7,336	.....	.....	.....	.....	.....	.....	.....
French Indo China	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hejaz, Arabia, etc	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hongkong	.....	38	212	.....	.....	.....	.....	.....	240	338	.....	.....	.....
Japan	3,827	1,208	10,386	$9,819	2,220	4,010	9,140	8,953	1,907	2,242	.....	1,201	2,274
Kwantung, leased Territory	120	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Palestine and Syria	.....	27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	209
Turkey in Asia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
TOTALS, ASIA	$17,461	$5,347	$14,896	$9,819	4,236	$11,346	10,756	$10,964	4,055	$4,316	$416	$5,841	$4,619
OCEANIA													
Philippine Islands	$204	$3,411	$369	.....	287	$569	.....	.....	58,614	$43,022	$7,446	$3,065	.....
Australia	4,342	2,614	3,411	.....	180	458	.....	.....	850	611	.....	30,454	$2,159
British Oceania	.....	.....	.....	.....	.....	.....	.....	.....	252	250	.....	.....	.....
French Oceania	.....	24	.....	.....	.....	.....	.....	.....	653	652	.....	.....	.....
New Zealand	1,223	381	654	.....	501	1,697	1,875	$4,376	.....	.....	300	2,429	1,562
Other Oceania	.....	.....	.....	.....	.....	.....	.....	.....	102	146	.....	.....	.....
TOTALS, OCEANIA	$5,769	$6,430	$4,434	.....	968	$2,724	1,875	$4,376	60,471	$44,681	$7,746	$35,948	$3,721

United States by Countries During April, 1923

Waterproofed Clothing Value	Pneumatic Casings: Automobile Number	Pneumatic Casings: Automobile Value	Pneumatic Casings: Others Value	Solid Tires: Automobile and Motor Truck Value	Solid Tires: Others Value	Pneumatic Tubes: Automobile Number	Pneumatic Tubes: Automobile Value	Pneumatic Tubes: Others Value	Tire Repair Materials Value	Druggists' Rubber Sundries Value	Hard Rubber Goods: Battery Jars and Accessories Value	Hard Rubber Goods: Other Electrical Supplies Value	Hard Rubber Goods: Others Value	All Other Rubber Manufactures Value	Totals Value
.....	126	$2,172	$75	.....	.....	102	$245	$16	$35	.....	.....	.....	.....	.....	$2,660
.....	619	8,395	300	.....	.....	175	400	50	.....	$99	$343	.....	.....	$4,449	27,038
$822	5,131	59,146	737	$539	.....	6,104	9,028	191	.....	.....	.....	.....	.....	3,433	101,794
.....	18	159	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	159
.....	357	7,217	182	.....	.....	365	849	57	49	.....	.....	.....	.....	4,707	17,307
.....	215	5,648	.....	.....	.....	449	895	.....	419	1,023	.....	.....	$5,941	13,200	113,834
.....	119	2,552	260	.....	.....	41	73	44	.....	74	.....	.....	.....	698	4,561
.....	18	175	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	175
.....	752	9,582	22	582	.....	350	1,033	.....	.....	.....	.....	.....	.....	84	11,303
.....	244	2,637	.....	.....	.....	202	300	.....	.....	.....	.....	.....	.....	34	16,416
.....	1,419	15,922	585	.....	.....	1,290	2,678	109	.....	397	.....	.....	.....	560	37,073
.....	68	1,095	.....	9,907	.....	529	2,342	.....	279	.....	.....	.....	.....	743	14,357
.....	45	563	.....	.....	.....	25	49	.....	.....	.....	.....	.....	.....	.....	1,082
.....	1,048	14,136	1,689	1,023	.....	742	1,133	132	97	1,121	.....	.....	.....	1,367	30,487
503	1,313	21,824	45	8,406	.....	399	698	5	901	.....	163	.....	.....	677	49,785
.....	.....	.....	.....	.....	.....	4	22	.....	.....	.....	.....	.....	.....	.....	22
.....	316	3,449	.....	.....	.....	240	303	.....	50	.....	.....	.....	.....	64	6,128
.....	235	3,396	.....	.....	.....	216	472	.....	.....	.....	.....	.....	.....	.....	5,270
.....	359	5,019	.....	4,152	.....	75	130	.....	.....	335	.....	.....	290	1,514	19,923
597	4,570	84,647	877	1,067	.....	2,209	4,481	496	51	2,146	.....	.....	.....	2,959	122,585
.....	205	3,466	.....	.....	.....	144	311	33	.....	2,264	.....	.....	.....	221	8,793
.....	67,608	514,718	1,453	37,016	.....	40,179	48,064	455	3,526	20,204	303	$500	28,096	74,178	893,008
678	733	5,757	169	899	.....	.....	.....	11	275	.....	.....	.....	.....	3,024	34,258
.....	181	1,703	.....	.....	.....	164	207	.....	65	.....	.....	.....	.....	432	2,407
.....	.....	.....	.....	480	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,465
$2,660	85,699	$773,378	$6,394	$64,071	.....	54,004	$73,713	$1,599	$5,738	$27,663	$809	$500	$34,327	$112,344	$1,521,890
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	$161	.....	.....	.....	$2,679	$12,019
$351	118	$1,847	$95	.....	.....	73	$146	.....	.....	11,759	$14,177	$7,181	$4,916	101,266	347,903
1,387	6,687	86,626	864	$21,087	$224	782	1,417	$64	$2,601	1,431	644	48	.....	5,460	18,795
287	654	6,076	28	513	.....	430	552	.....	15	675	40	.....	722	4,101	14,924
1,122	166	2,737	.....	859	.....	172	276	.....	.....	.....	.....	.....	.....	27	906
113	29	173	.....	.....	.....	90	136	.....	.....	24	.....	.....	.....	412	4,592
.....	79	1,753	78	.....	211	72	179	.....	.....	25	.....	.....	.....	516	5,920
529	124	1,924	.....	202	350	114	356	.....	.....	197	.....	.....	.....	433	5,796
20	96	1,851	.....	258	.....	117	216	.....	174	296	.....	.....	112	119	4,227
25	43	711	.....	422	.....	32	75	.....	111	330	.....	.....	80	1,723	18,880
106	524	7,533	111	1,145	.....	1,015	1,728	.....	3	266	104	.....	.....	207	17,019
.....	306	7,178	.....	975	.....	645	1,743	.....	.....	2,264	.....	.....	1,201	13,149	177,578
37,294	3,431	27,619	2,608	1,452	232	984	2,653	106	1,426	2,595	.....	.....	.....	175	475
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	108	2,107	56,035
14,827	168	2,435	.....	.....	.....	168	424	.....	68	.....	.....	.....	338	301	2,138
.....	.....	.....	.....	.....	306	.....	.....	.....	65	14	.....	.....	.....	190	882
.....	15	224	.....	.....	.....	22	36	.....	.....	18	.....	.....	.....	961	17,546
.....	662	9,767	15	828	70	477	1,071	.....	141	154	.....	53	.....	672	7,150
.....	242	3,514	.....	462	27	416	735	.....	60	.....	.....	.....	.....	462	5,460
120	121	1,550	10	.....	42	286	399	3	14	34	.....	25	152	9,581	262,853
22,385	6,702	74,836	2,060	15,614	437	3,365	5,499	343	756	5,854	649	372	974	354	16,904
413	963	10,507	419	1,086	49	1,053	1,778	13	.....	718	.....	49	.....	49	5,225
419	44	419	.....	.....	.....	50	81	.....	.....	14	.....	.....	.....	8	2,298
.....	146	1,772	.....	174	.....	206	322	.....	22	.....	.....	.....	.....	97	9,077
.....	365	6,384	10	.....	297	364	787	.....	47	.....	.....	.....	.....	.....	1,230
33	55	664	.....	.....	.....	40	88	12	.....	.....	.....	.....	.....	.....	.....
$79,441	21,740	$258,100	$6,238	$45,077	$2,245	10,973	$20,697	$541	$5,503	$24,565	$15,614	$7,728	$8,603	$145,049	$1,015,794
$2,047	9,695	$93,125	$416	$4,242	$6,955	15,669	$23,598	$205	$3,713	$5,054	$4,254	.....	$107	$11,226	$284,414
.....	116	2,009	.....	.....	.....	24	72	.....	.....	.....	.....	.....	.....	193	5,049
.....	4,844	47,324	238	3,966	.....	3,392	4,897	.....	720	337	.....	.....	539	3,650	79,910
1,000	875	9,407	79	173	779	1,340	2,311	250	84	1,300	.....	$1,671	1,269	1,403	42,389
337	614	10,270	195	2,176	.....	688	1,678	.....	290	193	.....	.....	24	531	26,713
.....	77	1,135	.....	201	.....	54	174	.....	180	79	.....	269	.....	1,201	3,864
94	171	1,866	.....	.....	170	104	115	.....	29	27	.....	10	.....	801	6,654
.....	10	74	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	129	548
.....	1,515	20,495	115	1,091	.....	1,591	2,874	59	79	897	.....	186	150	866	35,696
2,594	1,798	16,097	.....	154	.....	493	1,002	.....	125	255	.....	.....	.....	1,439	33,813
.....	380	3,881	.....	46	.....	691	1,192	.....	11	427	.....	13	.....	161	10,915
$6,072	20,095	$205,683	$1,043	$12,049	$7,904	24,046	$37,913	$514	$5,240	$8,569	$4,254	$2,089	$2,089	$21,600	$529,965
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	$1,635
.....	159	$1,380	.....	.....	.....	192	$255	.....	.....	.....	.....	.....	.....	.....	40,132
.....	1,655	17,955	$60	$2,696	$4,980	867	1,545	$27	$222	$649	.....	.....	.....	$603	5,359
.....	241	2,985	.....	1,298	427	125	250	.....	12	.....	.....	.....	.....	.....	31,941
.....	2,689	23,935	453	2,403	.....	1,126	1,496	102	.....	.....	.....	.....	.....	857	25,262
.....	421	5,711	.....	60	.....	236	450	.....	29	1,136	$17	.....	.....	2,946	452
.....	30	200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27	30,425
$44	1,277	18,942	146	7,550	202	707	1,458	159	81	.....	.....	.....	.....	174	9,853
.....	520	7,454	.....	96	.....	344	637	.....	.....	.....	.....	.....	.....	133	10,100
2,416	.....	.....	.....	.....	144	.....	.....	.....	.....	.....	.....	.....	.....	340	144
.....	.....	.....	.....	.....	.....	822	1,292	.....	.....	.....	.....	.....	.....	.....	11,168
.....	932	9,876	.....	.....	.....	196	282	.....	95	84	.....	.....	.....	2,178	6,557
.....	334	3,330	.....	.....	.....	3,565	5,928	375	.....	821	.....	$375	.....	8,145	136,327
157	5,535	65,694	.....	10,912	.....	219	400	.....	.....	.....	.....	.....	.....	.....	2,777
.....	275	2,257	.....	.....	.....	437	915	10	72	77	.....	.....	.....	362	16,944
.....	772	9,272	.....	.....	.....	30	42	.....	.....	.....	.....	.....	.....	.....	223
.....	20	181	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
$2,617	14,860	$169,172	$659	$25,015	$5,753	8,866	$14,950	$673	$511	$2,767	$17	$375	.....	$15,765	$323,299
$10,901	1,866	$22,411	$1,891	$6,633	$2,742	2,786	$5,124	$830	$395	$833	.....	.....	.....	$4,101	$113,947
1,128	5,165	61,723	1,500	17,063	192	2,256	4,618	120	3,128	1,269	$758	$408	.....	6,648	142,604
.....	8	92	.....	17	.....	8	15	.....	146	.....	.....	.....	.....	14	534
.....	40	482	249	42	197	48	71	49	511	.....	.....	47	.....	.....	2,324
.....	10,041	142,104	548	12,017	.....	8,275	15,657	48	6,533	124	133	.....	.....	2,685	192,471
218	23	378	.....	.....	.....	28	62	.....	.....	.....	.....	.....	.....	.....	804
$12,247	17,143	$227,190	$4,188	$35,772	$3,131	13,401	$25,547	$1,047	$16,713	$2,226	$891	$455	.....	$13,448	$452,684

Exports of India Rubber Manufactures from the United

	Belting Value	Hose Value	Packing Value	Thread Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Canvas Shoes with Rubber Soles Pairs	Canvas Shoes with Rubber Soles Value	Soles and Heels Value	Leather Cloth or Artificial Leather Value	Waterproofed Auto Cloth Value
AFRICA													
British West Africa	.....	.....	.....	.....	.....	.....	.....	.....	$336	$256	.....	.....	.....
British South Africa	$17,693	$20,019	$3,286	$277	688	$2,350	.....	.....	14,018	9,082	$2,810	$5,353	$819
British East Africa	.....	48	.....	.....	.....	.....	.....	.....	.....	.....	.....	339	.....
Canary Islands	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	90	469	.....
Egypt	.....	51	.....	.....	.....	.....	.....	.....	.....	.....	.....	283	52
Morocco	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	287
Portuguese East Africa	5,655	.....	1,036	.....	.....	.....	.....	.....	.....	.....	.....	289	.....
TOTALS, AFRICA	$23,348	$20,118	$4,322	$277	688	$2,350	.....	.....	14,354	$9,338	$2,900	$6,733	$1,158
GRAND TOTALS	$133,234	$124,256	$62,847	$127,578	23,340	$73,742	49,172	$50,293	465,198	$333,521	$60,945	$250,121	$84,954

Compiled from statistics supplied by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.

Custom House Statistics

New York

Imports

	January, 1922 Pounds	January, 1922 Value	January, 1923 Pounds	January, 1923 Value
UNMANUFACTURED—*free*				
Crude rubber				
From Austria	.....	.....	1,350	$371
Belgium	415,786	$41,447	393,025	66,222
France	224,082	29,157	921,102	263,684
Germany	.....	.....	193,167	22,290
Netherlands	2,847,713	535,731	845,354	143,919
England	6,387,143	1,172,919	2,541,927	465,064
Nicaragua	7,050	1,061	3,972	417
Mexico	.....	.....	8,198	1,944
Argentina	9,576	992	.....	.....
Brazil	1,994,268	233,470	2,869,443	480,739
Colombia	101,933	11,706	13,627	2,614
Ecuador	27,689	4,142	96,920	19,616
Peru	.....	.....	47,708	18,487
Uruguay	.....	.....	71,319	41,032
Venezuela	.....	.....	11,045	7,215
British India	53,760	10,380	89,600	12,899
Ceylon	5,619,673	864,097	7,059,251	1,390,469
Straits Settlements	28,420,875	3,956,333	40,456,549	6,912,015
Java	2,244,991	343,711	10,399,587	1,808,766
Dutch East Indies	3,345,441	550,669	7,299,984	1,489,903
Hongkong	56,000	3,945	.....	.....
Japan	.....	.....	1,041,600	228,357
Philippine Islands	.....	.....	144,007	43,202
Russia in Asia	.....	.....	6,720	1,044
Turkey in Asia	.....	.....	22,410	2,823
Totals	51,755,980	$7,809,760	74,537,865	$13,423,042
Balata	157,253	87,873	63,026	43,332
Jelutong (Pontianak)	141,779	12,956	808,688	58,410
Gutta percha	.....	.....	317,036	53,655
Totals	52,055,012	$7,910,589	75,726,615	$13,578,439
Rubber scrap and reclaimed	178,095	7,840	933,905	46,613
Totals, unmanufactured	52,233,107	$7,918,429	76,660,520	$13,625,052
MANUFACTURED				
Rubber belting for machinery, *dutiable*	.....	$63,410	8,346	$15,116
Other manufactures of rubber and substitutes....*dutiable*	4,579	562	.....	52,656
Chicle .....*dutiable*	475,922	225,296	.....	.....

Foreign Exports

Crude rubber	.....	.....	1,233	$248
Balata	103,905	$53,627	29,010	9,153
Manufactures of rubber and gutta percha	.....	.....	30	253
Rubber scrap and reclaimed	.....	.....	.....	.....
Rubber manufactures	.....	73	.....	.....
Chicle	.....	.....	966	402
Rubber substitutes	.....	.....	.....	.....

Exports

	January, 1922 Pounds	January, 1922 Value	January, 1923 Pounds	January, 1923 Value
MANUFACTURED				
Rubber scrap and reclaimed	616,647	$43,515	593,361	$33,400
Automobile and other tires, *number*	.....	982,196	153,076	1,252,735
Inner tubes.....*number*	.....	79,986	69,038	113,804
Tire repair materials	.....	.....	43,535	19,451
Boots and shoes.....*pairs*	47,122	40,836	37,248	55,969
Canvas shoes with rubber soles .....*pairs*	.....	.....	239,897	177,761
Soles and heels	.....	72,502	110,123	45,330
Battery jars and accessories	.....	.....	20,466	10,433
Other electrical supplies	.....	.....	29,495	13,562
Other hard rubber goods	.....	.....	21,004	15,834
Druggists' rubber sundries	.....	23,783	44,099	41,719
Belting, hose and packing	.....	121,565	496,512	206,839
Thread	.....	.....	53,428	49,956
Other rubber manufactures	.....	213,324	161,403	110,791
Totals, manufactured	.....	$1,577,707	.....	$2,147,584

Imports of Crude Rubber Into the United States by Customs Districts

	March, 1922 Pounds	March, 1922 Value	March, 1923 Pounds	March, 1923 Value
Massachusetts	673,123	$100,654	3,055,799	$1,029,947
New York	61,595,244	10,553,387	65,066,720	17,710,328
Maryland	.....	.....	56,000	16,927
El Paso	.....	.....	56,010	11,202
Los Angeles	1,472,775	266,922	465,407	100,879
San Francisco	239,080	36,077	524,770	161,313
Colorado	235,000	42,000	56,000	10,969
Totals	64,215,222	$10,999,040	69,280,696	$19,041,565

	April, 1922 Pounds	April, 1922 Value	April, 1923 Pounds	April, 1923 Value
Massachusetts	190,950	$25,718	1,451,719	$451,986
New York	42,184,495	7,071,100	62,423,183	19,496,187
Philadelphia	.....	.....	20,668	4,080
Maryland	.....	.....	1,758,625	444,362
El Paso	145,300	29,060	56,000	11,200
Los Angeles	613,660	99,162	1,753,100	874,655
San Francisco	272,754	46,988	1,288,192	419,388
Washington	.....	.....	33,600	11,760
Colorado	.....	.....	661,688	162,780
Chicago	200	70	.....	.....
Totals	43,407,359	$7,272,098	69,446,775	$21,876,398

United States Crude and Waste Rubber Imports for 1923 (By Months)

	Plantations	Parás	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Total 1923	Total 1922	Balata	Miscellaneous	Waste
January .....*tons*	29,354	1,233	549	61	.....	.....	31,197	21,867	64	257	382
February	21,815	2,004	308	93	.....	.....	24,220	28,973	25	397	684
March	31,673	1,482	742	19	.....	.....	33,916	28,702	124	738	863
April	29,922	1,095	399	30	142	.....	31,588	14,444	40	1,504	507
May	34,609	1,042	333	24	167	9½	36,184½	20,622	55	463	361
Totals, 5 months, 1923..*tons*	147,373	6,856	2,331	227	309	9½	157,105½	.....	308	3,359	2,797
Totals, 5 months, 1922....	109,150	4,248	796	35	281	98	.....	114,608	110	2,030	269

Compiled from statistics supplied by the Rubber Association of America, Inc.

States by Countries During April, 1923—*Continued*

Waterproofed Clothing Value	Pneumatic Casings: Automobile Number	Pneumatic Casings: Automobile Value	Pneumatic Casings: Others Value	Solid Tires: Automobile and Motor Truck Value	Solid Tires: Others Value	Pneumatic Tubes: Automobile Number	Pneumatic Tubes: Automobile Value	Pneumatic Tubes: Others Value	Druggists' Rubber Tire Repair Materials Value	Druggists' Rubber Sundries Value	Hard Rubber Goods: Battery Jars and Accessories Value	Hard Rubber Goods: Other Electrical Supplies Value	Hard Rubber Goods: Others Value	All Other Rubber Manufactures Value	Totals Value
.....	259	$6,073	$29	.....	.....	259	$969	.....	.....	.....	.....	.....	.....	$48	$7,375
$7,361	5,779	59,649	.....	$1,196	.....	6,117	9,184	$204	$434	$1,516	$150	.....	.....	4,200	145,583
.....	241	3,709	411	.....	.....	749	1,255	91	263	.....	.....	.....	.....	115	6,231
.....	665	8,569	24	1,240	.....	412	1,023	26	177	.....	.....	.....	.....	.....	11,618
.....	233	2,596	.....	506	1,318	110	225	.....	56	677	.....	.....	.....	969	6,733
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,668
.....	51	583	.....	.....	.....	59	105	.....	.....	.....	.....	.....	.....	.....	287
$7,361	7,328	$81,179	$464	$2,942	$1,318	7,706	$12,761	$321	$930	$2,193	$150	.....	.....	$5,332	$185,495
$110,338	166,865	$1,714,702	$18,986	$184,926	$20,351	118,996	$185,581	$4,695	$28,635	$67,983	$21,735	$11,147	$45,019	$313,538	$4,029,127

British Malaya Rubber Exports

An official report from Singapore states that the gross exports of rubber from British Malaya in the month of May, 1923, amounted to 20,115 tons (45,059,200 pounds); the amount of rubber imported was 5,020 tons (11,246,700 pounds), so that net exports amounted to 15,095 tons as compared with 22,095 tons in the corresponding month of 1922.

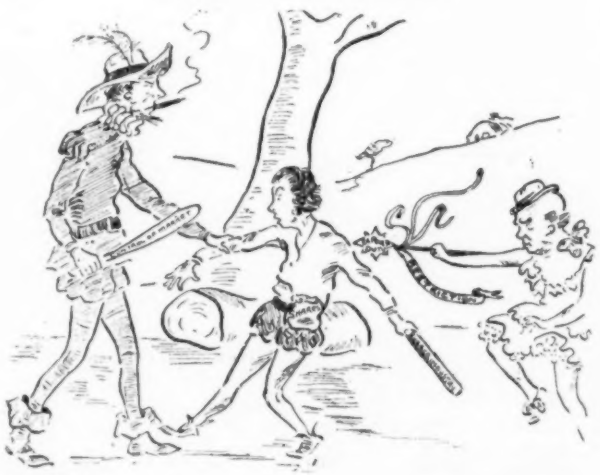
Appended are the comparative statistics of net exports:

	1922 Gross Exports Tons	1922 Net Exports Tons	1923 Gross Exports Tons	1923 Net Exports Tons
January	18,962	16,027	22,871	18,513
February	20,033	18,426	19,907	15,818
March	19,304	17,812	23,646	18,538
April	14,400	12,539	24,008	18,619
May	24,789	22,095	20,115	15,095
Totals	97,488	86,899	110,547	86,583

Plantation Rubber Exports from Malaya

	January 1 to March 31, 1923: Singapore Pounds	Malacca Pounds	Penang Pounds	January 1 to May 10, 1923 Port Swettenham Pounds
To United Kingdom	2,054,900	2,312,250	1,583,600	1,766,114
The Continent	5,546,800	1,455,400	1,809,100	44,800
Japan	7,173,900	336,000	100,800	.....
United States	75,807,300	8,967,800	16,045,400	685,826
British Possessions	752,600	.....	105,700	77,675
Other countries	49,400	.....	100	.....
Totals	91,384,900	13,071,400	19,644,700	2,574,415

THE PLANTERS' VIEWPOINT



The Planter

Rubber Baron (with decided Yankee accent): "Say, will you hand up the candy or must I your carcass drub"? Fairy Winnie (advancing precipitately from wings): "Am I in time? I think I am. Naughty Baron, drop your club."

Rubber Statistics for the Dominion of Canada

Imports of Crude and Manufactured Rubber

	March, 1922 Pounds	March, 1922 Value	March, 1923 Pounds	March, 1923 Value
UNMANUFACTURED—*free*				
Rubber, gutta percha, etc.				
From United Kingdom	313,107	$51,119	1,246,359	$419,188
United States	1,697,345	269,916	2,701,900	877,703
British East Indies				
India	33,600	4,596	.....	.....
Ceylon	44,817	9,394	336,000	106,664
Straits Settlements	44,880	11,220	410,880	124,725
France	.....	.....	56,000	21,359
Other Countries	.....	.....	67,934	13,315
Totals	2,133,749	$346,245	4,819,073	$1,562,954
Rubber, recovered	155,012	17,290	273,206	25,937
Rubber, powdered, and rubber or gutta percha scrap	201,981	13,417	573,466	20,000
Balata	.....	.....	1,726	1,537
Rubber substitutes	64,123	6,505	167,363	14,797
Totals, unmanufactured	2,554,865	$383,457	5,834,834	$1,625,225
PARTLY MANUFACTURED				
Hard rubber sheets and rods	1,700	$1,204	3,141	$1,784
Hard rubber tubes	.....	1,784	.....	973
Rubber thread, not covered	12,948	14,190	6,947	9,013
Totals, partly manufactured	14,648	$17,178	10,088	$11,770
MANUFACTURED				
Belting	.....	$12,723	.....	$20,803
Hose	.....	10,446	.....	11,711
Packing	.....	6,677	.....	7,896
Boots and shoes *pairs*	.....	10,566	3,804	12,323
Clothing, including waterproofed	.....	23,583	.....	22,597
Gloves	.....	1,490	.....	2,001
Hot water bottles	.....	452	.....	6,012
Tires, solid	.....	12,006	.....	32,312
Tires, pneumatic	.....	127,201	.....	100,002
Inner tubes	.....	13,387	.....	29,700
Elastic, round or flat	.....	52,069	.....	42,612
Mats and matting	.....	138	.....	640
Cement	.....	7,949	.....	7,250
Other rubber manufactures	.....	191,563	.....	193,884
Totals, manufactured	.....	$470,250	.....	$489,742
Totals, rubber imports	.....	$870,885	.....	$2,126,738

Exports of Domestic and Foreign Rubber Goods

	March, 1922: Produce of Canada Value	March, 1922: Reexports of Foreign Goods Value	March, 1923: Produce of Canada Value	March, 1923: Reexports of Foreign Goods Value
UNMANUFACTURED				
Crude and waste rubber	$4,655	.....	$10,439	$376
Totals, unmanufactured	$4,655	.....	$10,439	$376
MANUFACTURED				
Belting	14,589	.....	39,345	.....
Canvas shoes with rubber soles	82,204	.....	195,783	.....
Boots and shoes	36,669	.....	19,473	.....
Clothing, including waterproofed	444	.....	368	.....
Hose	4,090	.....	10,878	.....
Tires, casings	.....	.....	648,949	.....
inner tubes	.....	.....	81,701	.....
pneumatic	404,016	.....	.....	.....
solid	17,226	.....	6,729	.....
vehicle	.....	219	.....	16,818
Other rubber manufactures	54,395	5,732	23,689	3,295
Totals, manufactured	$613,633	$5,951	$1,026,915	$20,113
Totals, rubber exports	$618,288	$5,951	$1,037,354	$20,489

Official India Rubber Statistics for the United States

Imports of Crude and Manufactured Rubber

	Twelve Months Ended December 31			
	1921		1922	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—*free*				
Crude rubber				
From France	585,375	$66,237	833,630	$86,393
Netherlands	20,642,692	3,461,752	9,881,286	1,876,404
Portugal	1,248,472	138,401	1,301,592	61,146
United Kingdom	41,520,535	6,358,199	50,879,517	8,922,588
Canada	279,331	108,038	356,330	83,266
Central America	34,457	4,652	18,564	2,560
Mexico	.....	.....	373,401	70,849
Brazil	23,274,281	2,753,615	25,008,853	3,186,241
Peru	249,226	35,177	460,676	91,570
Other South America	984,577	199,585	1,410,847	249,504
British East Indies	268,040,047	49,550,349	484,630,587	71,719,201
Dutch East Indies	53,012,222	10,497,109	92,124,220	14,647,103
Other countries	5,412,086	599,563	7,130,939	846,363
Totals	415,283,304	$73,722,677	674,410,392	$101,843,188
Balata	1,827,398	1,077,856	1,819,022	978,765
Jelutong (Pontianak)	3,968,401	351,893	5,229,505	403,812
Gutta percha	2,205,509	333,564	1,832,950	281,012
Rubber scrap	3,727,647	192,975	5,965,041	207,764
Totals, unmanufactured	426,947,259	$75,678,968	689,256,910	$103,714,541
Chicle ..... *dutiable*	6,963,663	$3,562,118	†6,669,928	$†3,320,534
MANUFACTURED—*dutiable*				
Rubber belting	.....	.....	*59,348	*$66,913
Other manufactures of and substitutes for rubber	.....	$1,102,011	.....	1,488,219

	January, 1922		January, 1923	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—*free*				
Crude rubber				
From France	224,082	$29,157	921,102	$263,684
Netherlands	2,847,713	535,731	845,354	143,919
United Kingdom	6,387,143	1,172,919	2,562,137	470,944
Canada	4,645	764	.....	.....
Central America	7,050	1,061	3,972	417
Mexico	.....	.....	8,198	1,944
Brazil	1,994,238	283,470	2,869,443	480,739
Peru	.....	.....	47,708	18,437
Other South America	139,198	16,840	193,268	70,529
British East Indies	36,300,528	5,126,274	52,421,183	9,141,859
Dutch East Indies	5,634,535	899,304	18,088,976	3,354,044
Other countries	471,786	45,392	1,802,279	364,309
Totals	54,010,946	$8,110,912	79,763,620	$14,310,825
Balata	157,253	$87,878	63,026	$43,332
Jelutong (Pontianak)	141,779	12,956	821,344	59,550
Gutta percha	.....	.....	344,689	55,618
Rubber scrap	578,236	18,583	1,659,853	67,868
Totals, unmanufactured	877,268	$119,317	2,888,912	$226,368
Chicle ..... *dutiable*	898,964	$423,845	.....	.....
MANUFACTURED—*dutiable*				
Rubber belting	.....	.....	32,208	$28,410
Other manufactures of and substitutes for rubber	.....	$129,883	.....	67,018

Exports of Domestic Merchandise

MANUFACTURED				
India rubber				
Reclaimed	1,255,261	$154,656	2,274,424	$216,257
Scrap and old	7,837,434	423,602	8,383,752	340,541
Footwear				
Boots[1] ..... *pairs*	213,180	567,832	241,919	630,549
Shoes[1] ..... *pairs*	2,668,850	2,829,109	863,559	751,486
Canvas shoes with rubber soles[1] ..... *pairs*	.....	.....	2,977,627	2,358,463
Druggists' rubber sundries[1]	.....	874,813	795,793	871,465
Hard rubber goods				
Battery jars and accessories[1]	.....	.....	425,849	133,796
Other electrical supplies[1]	.....	.....	193,734	87,432
Other hard rubber goods[1]	.....	.....	424,799	386,993
Tires				
Pneumatic casings				
For automobiles[1]	.....	13,422,266	1,326,220	16,604,459
Others[1]	.....	.....	54,931	234,718
Pneumatic tubes				
For automobiles[1]	.....	1,232,104	936,718	1,775,227
Others[1]	.....	.....	40,363	49,648
Solid tires				
For automobile and motor trucks	.....	1,300,081	55,665	1,518,932
Others[1]	.....	.....	769,857	210,050
All other tires[1]	.....	358,963	.....	.....
Tire repair materials[1]	.....	.....	772,170	310,034
Belting[1]	.....	1,446,063	2,585,334	1,268,235
Hose[1]	.....	1,945,300	3,381,210	1,340,244
Packing[1]	.....	715,574	1,149,446	546,115
Soles and heels[1]	.....	512,320	1,734,396	699,135
Thread[1]	.....	.....	1,062,567	1,183,301
Other rubber manufactures[1]	.....	5,003,530	4,599,921	2,480,550
Totals, manufactured	.....	$30,786,213	.....	$34,007,630

MANUFACTURED				
India rubber				
Reclaimed	149,423	$15,472	403,657	$33,578
Scrap and old	814,009	48,012	1,041,686	49,777
Footwear				
Boots[1] ..... *pairs*	6,055	17,734	19,872	46,179
Shoes[1] ..... *pairs*	54,387	46,773	25,764	24,653
Canvas shoes with rubber soles[1] ..... *pairs*	109,252	90,428	319,123	234,649
Druggists' rubber sundries[1]	34,621	41,391	58,921	57,837
Hard rubber goods				
Battery jars and accessories[1]	5,576	1,413	56,211	25,059
Other electrical supplies[1]	10,227	3,793	36,858	16,330
Other hard rubber goods[1]	34,590	24,225	29,392	26,006
Tires				
Pneumatic casings				
For automobiles[1] ..... *number*	80,388	1,148,092	126,180	1,378,217
Others[1] ..... *number*	1,647	5,246	11,175	39,762
Pneumatic tubes				
For automobiles[1] ..... *number*	48,933	116,345	80,547	134,792
Others[1] ..... *number*	1,179	1,281	4,878	4,971
Solid tires				
For automobiles and motor trucks[1] ..... *number*	3,822	147,641	8,031	183,803
Others[1]	22,610	8,231	41,439	11,129
All other tires[1]	.....	.....	.....	.....
Tire repair materials[1]	22,340	10,293	55,771	24,380
Belting[1]	151,006	79,610	309,921	153,079
Hose[1]	175,073	73,210	352,623	125,905
Packing[1]	55,442	29,246	95,589	43,023
Soles and heels[1]	70,332	36,831	171,562	62,973
Thread[1]	80,492	102,018	55,348	52,277
Other rubber manufactures[1]	325,055	183,972	342,523	204,521
Totals, manufactured	.....	$2,231,257	.....	$2,932,960

Exports of Foreign Merchandise

UNMANUFACTURED				
India rubber	12,804,264	$2,414,924	10,772,258	$1,928,869
Balata	929,116	456,243	779,746	468,084
Jelutong (Pontianak)	318,243	43,679	43,795	5,997
Totals, unmanufactured	14,051,623	$2,914,846	11,595,799	$2,402,950
MANUFACTURED				
Gutta percha and india rubber	.....	$114,874	.....	$8,920
India rubber substitutes	20,584	3,270	460	450
Totals, manufactured	20,584	$118,144	460	$9,370

UNMANUFACTURED				
India rubber	1,174,093	$219,519	1,981,195	$577,885
Balata	103,905	53,627	29,010	9,153
Jelutong (Pontianak)	.....	.....	.....	.....
Totals, unmanufactured	1,277,998	$273,146	2,010,205	$587,038
MANUFACTURED				
Gutta percha and india rubber	.....	$373	40	$278
India rubber substitutes	.....	.....	.....	.....
Totals, manufactured	.....	$373	40	$278

*Beginning September 22, 1922.

†January 1 to September 21, 1922. Details of exports of domestic merchandise by countries during the year 1922, appeared on page 536 to 539 of our May, 1923, issue.

‡Details of exports of domestic merchandise by countries during January, 1923, appeared on pages 470 to 473 of our April issue.

Steel Studded Non-Skid Tire Treads

Every motorist interested in the economy of his car as well as the safety of its occupants should study the problem of the grip of the tire tread on the road surface.

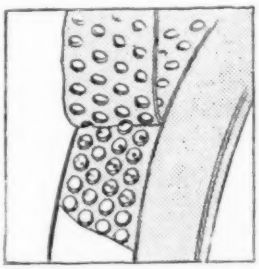
In order to secure effective gripping conditions much study has been devoted by the manufacturers to produce non-skidding designs on their tire treads. These efforts have been successful in varying degree but not dependably so under all road surface conditions. In other words, certain conditions of road surface, as dry polished wood pavement, dry macadam, or stone blocks, etc., require rubber grip. Other conditions, such as greasy surfaces on wood and macadam or wet slimy clay roads, require steel grip. For these reasons the motorist is prepared with non-skid steel chains to armor his tires where steel grip is necessary.

Beldam Steel Studded Tire

In the past attempts have been made in America to produce a combination metal and rubber anti-skid tread but with practically little success, partly because the metal studs were not suitably secured in the rubber to hold without injury to the tread, and because the use of metal studded tires causes so much injury to the road surface as to bring about prohibitory rules forbidding them. A combination tread of rubber containing suitably anchored steel studs is probably no more injurious to road surfaces than the ordinary tire chain. As a compromise on the score of safety such tire treads are permitted in London, where it is reported that the Scotland Yard authorities for public safety will not pass taxicabs shod with two all-rubber or two all-steel tires on rear wheels, but insist on one rear wheel being shod with steel grip and the other with rubber. The back wheels must be kept from skidding on all conditions of road surfaces and each wheel must have rubber for rubber grip and steel where steel grip is necessary.

Palmer Steel Tread Stud

This ruling has brought about several designs of steel studded tires in England, two of which are here illustrated. Grip and friction mean loss of life and tire mileage, therefore in designing a steel and rubber tread the proportion of steel must be such that it does not interfere in any degree with the rubber grip, so that the tire will grip on any condition of road surface.



Applying Palmer Studs

A tire which is said to conform to the foregoing principles is known as the "V" studded tire, in which the steel studs remain securely anchored throughout the life of the tire, their top surfaces wearing down in relative conformity with the surface of the surrounding rubber tread.

A second example of steel studded tire is the Palmer cord, into the tread of which is built a series of studs of peculiarly designed anchorage. The head of this stud is of hard steel. It has a crablike base or root of tough steel. The latter anchors the stud into the rubber of the tread and not into the fabric foundation of the tire. The method of placing and molding these studs into the tread is shown in the illustration. Previous to being molded into the rubber the studs are held by the head in a lead strip. The internal pressure during the curing process forces the rubber of the tread to embrace the roots of the studs until only the heads remain above the level of the rubber. When the tire is finished the lead strip is pulled away in the manner shown in the picture.

Rubber-Covered Cables

Cable manufacture is a highly specialized industry and a considerable investment in both machinery and stock is required for cable production in all its branches. In the United States cables are made mainly in the large electrical establishments, although there are a number of smaller firms in the business, most of whom specialize upon only a few lines.

England, however, excels in cable manufacture, having a practical monopoly of submarine cable production. The prestige of English cable is so well established and its export market so extended that in 1920 British exports exceeded those of the United States by nearly four times. A strong Italian organization, the Pirelli Company, maintains general cable works at Southampton, England, and produces G. E. C. tough rubber-covered cable in all sizes, especially suited for industrial work. On account of its peculiar qualities the Institution of Electrical Engineers provides in its wiring rules for the employment of this particular cable.

Classes of Cables

Cables are of two general classes, those for conducting power currents and those for signaling currents. They are bare or insulated according to the service for which they are used. For power cables the insulation most commonly used is paper saturated with petroleum compounds, although rubber and rubber compounds are also widely used, especially for interior work. Rubber-covered power cables are used extensively for small wires and cables in buildings and for outside installations exposed to water, and in submarine work. The flexible armored cable used in great quantities for interior wiring has a rubber covering wrapped with cotton braid and armored with spiral steel tape to obviate the use of conduit when it is run through the walls of a building. Another important branch of the industry is the manufacture of lamp cord, which is rubber-covered, with an outer braid of cotton or silk.

The production of submarine telegraph cables, though the output is much smaller than that of insulated wire and cables, is nevertheless a highly specialized and important industry. In this country manufacture has not been carried on successfully, although one of the large cable makers of the United States is now considering the establishment of such a plant. Gutta percha is ordinarily used as insulation for these submarine cables, while they are further protected from mechanical injury by an armor of stranded wire. It is interesting to note that such cables as manufactured fifty years ago carried currents of only 50 volts, whereas today there are power cables four inches in exterior diameter, capable of carrying 15,000 kilowatts at 33,000 volts between phases. Smaller and shorter cables, such as are used under rivers, have usually a covering of india rubber.

Cable Production

As regards cable production, Great Britain easily leads, and is also the largest exporter. Germany is a large producer but the output is of inferior quality and cheap in price. Although Japan has not yet established a reputation along this line, the country is well supplied with copper and cable production is rapidly increasing. American cable manufacturers are about on an equal footing with those in European countries in obtaining supplies of various materials. Our production of insulated wires and cables, as reported by the federal census, has greatly increased in recent years, advancing from $69,505,573 in 1914 to $125,880,847 in 1919.

INDIA RUBBER WORLD
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GUTTA-PERCHA
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